# POPULAR Computing WEEKLY

35p 15-21 December 1983 Vol 2 No 50


## This Week

**Games designers**
Graham Taylor looks at three different games designers — programs which enable you to write your own arcade and adventure games. See page 18.

**Commodore 64**
Czes Kosniowski explains how trigonometry functions can be used for different programming techniques on page 30.

**Valhalla**
Graham Taylor talks to John Peel of Legend about the making of *Valhalla*. See page 16.

**New releases**
All the latest software games including *Jumbly* from DK'Tronics. See page 80.


★STAR
Abandon Earth on Vic20. See page 10.
GAME★


## News Desk

### Oric 2 gets go-ahead

FOLLOWING its take-over by Edenspring Investments, Oric has put back plans for an IBM PC compatible micro.

Instead, the company will go ahead with development of a new home computer — the Oric 2 — that will compete with the Electron and Commodore 64 machines.

The Oric 2 will be broadly similar to the first Oric machine. It will run the same form of Basic in an improved Oric Rom containing some extra commands including *Verify* and *Merge*. According to Tansoft's Paul Kaufman, though, "All the existing Tansoft software will work with the new machine."

With 64K Ram, the Oric 2 will have more memory than the Oric 1. Most of the additional memory will be used as video Ram. The computer will also feature a full-size full-travel keyboard and a completely new manual.

The Oric 2 is scheduled for launch in early March and will appear after the new Sinclair 'professional computer', now expected in late February.

### What future now for Atari?

THERE is increasing speculation that Warner Communications may sell its ailing Atari computer division.

This follows the recent purchase by Australian publisher Rupert Murdoch of 6.7 percent of Warner Communications. Murdoch paid $98m for 4.4m shares, making it Warner's largest single shareholder.

The most likely attraction of Warner Communications is its extensive film library and 50 percent share in Warner Amex Cable Communications. Murdoch is already heavily involved in cable and satellite communications with News America, Skyband and Satellite Television UK, and the Warner's film library would make a rich killing.

Warner Communications is in deep financial trouble, mainly brought about by its Atari computer division which has lost in excess of $500m in the last nine months.

It is now considered possible that Murdoch may try to swap his shares for Warner Bros Pictures.

In the event of a Murdoch

Continued on page 5

*Publisher Rupert Murdoch*

## Classified

### Computer Swap
01-437 4343

Free readers entries to buy or sell a computer.
Ring 01-437 4343 and give us the details.


AQUARIUS
SEE PAGE 55

VALHALLA


**GIVE YOUR BBC MICRO SOME STICK!**

Joystick utility is a very clever program that will allow you to use joysticks with most programs on your BBC Micro Computer.
✦ Simple to use — just press the keys ✦ Requires just one block of memory space ✦ Relocatable in memory ✦ Sensitivity of joysticks can be varied.

This is an invaluable program that will heighten your enjoyment of your Micro. It is very easy for the beginner to use, but also provides plenty of scope for the more experienced user.

**JOYSTICK UTILITY — £5 INC.** (DISC — COMPATIBLE)
CHEQUES TO:
**Clares Micro Supplies**
**Dept. PCW, 222 Townsfields Road, Winsford, Cheshire**
**Tel: (06606) 51374**

**ZX SPECTRUM 48K,** programmable joystick, Ferguson cassette recorder, loads of software tapes plus magazines, including VU 3D, Blind Alley, Swordfight and more worth over £400, sell £220. 75 Hindburn Close, Bessacarr, Doncaster.

**SPECTRUM 48K** (issues) all complete + Manic Minor, £100. Tel: Brighton 776833.

**32K RAM PACK** for AM issue one Sinclar Spectrum, £18. Tel: 051 625 8604.

**SPECTRUM 48K,** plus ZX printer, five rolls of paper, compiler, magazines, Chess and three books, £150, will sell computer and printer for £125. Tel: Russell, 061-740 4756 (evenings).

**FOR SALE!** Spectrum software, 3D Tanx, Orbiter, £3.50 each, Gulpman £3, Mined Out, Frenzy, Roman Empire, Escape, £2.50, Winged Avenger, all good condition. R. A. Kidd, 20 Buckfast Close, Ipswich, Suffolk.

**WANT A GREAT BYTE THIS XMAS.** Spectrum software half list price, Mad Martha's 1+2, Scrabble, Zzoom, Zip-Zap and probably all others in this column. N.B. originals. Phone Reading 697095.

Continued on page 73

# The first program in Software Farm's HIGH-RES RANGE!

CAN BE SEEN AT
"YOUR COMPUTER" XMAS FAIR
STAND V25 (SINCLAIR VILLAGE)
WEMBLEY CONFERENCE CENTRE
DECEMBER 15-18

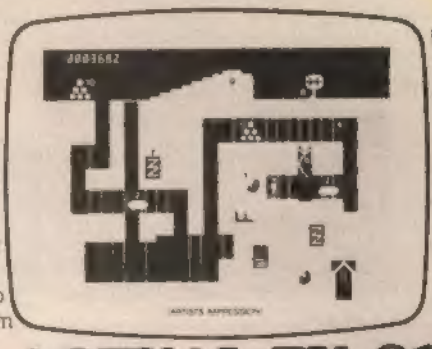
# FORTY NINER
## the ZX-81 BREAKTHROUGH!
ONLY PROGRAM OF IT'S KIND IN THE WORLD!

**ZX-81 Resolution identical to the SPECTRUM without any additional hardware!!**

**In 1849 the Great American Gold rush started. Almost everyone who could, sold up everything and dashed to the west coast to look for this precious metal – including YOU!**

You must dig for those nuggets (1) – But watch out for the giant rats (2) They burrow through the earth (3) to get into your tunnel. You can delay them for a while by knocking down a support (4) which causes a small cave-in (5) to block their way, but you can only destroy them by releasing a snake (6) from it's nest (7), when it heads straight for the surface, destroying everything in it's way.

All the time the Gremlin (8) is busy digging it's way through your waste earth pile (9) to reach the entrance to your mine. Once it does you have no escape!! – so you must stop it getting there by returning to the surface to replenish the main mound (9) with the smaller pile of earth which appears on the surface as you dig (10). The deeper you dig the more points you score – but the further you have to go to replenish that mound! Once all nuggets have been collected, a cave opens (11) allowing you to pass through to the next stage – if you can reach it! This gives you more rats – but less snakes to destroy them with!!



ACTUAL ZX-81 SCREEN DISPLAY

**Skill levels**
**Extra man every 10,000 points**
**Hall of Fame**
**Define your own keys for ease of play or use with any joystick**
**Fantastic and unique graphics on a ZX-81 (with 16K)**
**Only £5.95 – No more than many ordinary programs**
**A truly interesting and exciting game that no ZX81 owner can afford to be without**

**Available from all good computer shops or send cheque/P.O. for £5.95 (inc P&P) to:**
**Software Farm, FREEPOST (No stamp required) (BS3658)(C, Bristol BS8 2YY**

Software Farm, 155 Whiteladies Road, Clifton, Bristol BS8 2RF. Tel: (0272) 731411 Telex 444742 AFMADV G

POPULAR Computing WEEKLY

15-21 December 1983 Vol 2 No 50

SUNSHINE

## The Team

**Editor**
Brendon Gore
**News Editor**
David Kelly
**Software Editor**
Graham Taylor
**Production Editor**
Lynne Constable
**Editorial Secretary**
Cleo Cherry
**Advertisement Manager**
David Lake
**Advertisement Executive**
Alastair Macintosh
**Classified Executive**
Diane Davis
**Advertising Production**
Lucinda Lee
**Administration**
Theresa Lacy
**Managing Editor**
Duncan Scot
**Publishing Director**
Jenny Ireland

*Popular Computing Weekly*,
12-13 Little Newport Street,
London WC2R 3LD
Telephone: **01-437 4343**

Published by Sunshine Publications Ltd.

Typesetting, origination and printing by Chesham Press, Chesham, Bucks

Distributed by S M Distribution London SW9. 01-274 8611. Telex: 261643

© Sunshine Publications Ltd 1983

ABC

MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

**Registered at the Post Office as a newspaper**

ISSN 0265-0509

**How to submit articles**

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

All submissions should be typed and a double space should be left between each line. Please leave wide margins.

Programs should, whenever possible, be computer printed.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your own program returned you must include a stamped, addressed envelope.

**Accuracy**

*Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

## This Week

**News** 5, 7
Atari future

**Letters** 9
Microdrive difficulties

**Star Game** 10
Abandon Earth on Vic20

**Street Life** 16
Graham Taylor talks to John Peel of Legend

**Reviews** 18
Graham Taylor looks at games designers

**Programming** 22
Structured programming on ZX81

**Dragon** 24
Print routine by Richard Walton

**Spectrum** 27
Machine code series by Trevor Toms

**Commodore 64** 30
Uses of trigonometry by Czes Kosniowski

**Reviews extra** 32
Dragon enhancements II by Keith and Steven Brain

**BBC & Education** 36
Word search by Ian and Damian Inger

**Open Forum** 53
Eight pages of your programs

**Adventure** 69
Tony Bridge's corner

**Peek & poke** 71
Your questions answered

**New releases** 80
Latest software programs

**This week**
Top 10 plus all this week's software

**Competitions** 83
Puzzle, Ziggurat, Losers

## Editorial

Newspaper magnate Rupert Murdoch has spent nearly $100m in acquiring a 6.7 percent share of Warner Communications. This makes Mr Murdoch, in the form of his News Corporation, the largest single shareholder in Warner.

This information is of more than esoteric interest because Warner numbers Atari among its subsidiaries. Atari, once the jewel in Warner's crown, has lost more than $536m so far this year.

Both Warner and Rupert Murdoch would appear to be anxious to rid themselves of Atari as soon as possible. Warner can hardly continue to absorb losses on such a massive scale, while Murdoch's interest lies in Warner's film and tv operations. Atari has suddenly become persona non grata in a very big way.

However, while Warner and Murdoch might wish to offload Atari, who would want to buy it? Given the current state of the micro market, it is extremely unlikely that anyone will be able to turn Atari round and start making a profit — at least not in the short-term.

US companies, aware of the problems that have beset Texas, Mattel, Osborne and other micro firms, are unlikely to see any advantage in buying Atari. But European companies might see Atari as a useful entry to the American market, which is potentially the most profitable in the world.

## Next Thursday

**Can you guide Santa up and down chimneys and ladders in time to deposit all his presents? Find out in next week's star game for the Spectrum.**

## Subscribe to Popular Computing Weekly

I would like to subscribe to *Popular Computing Weekly*
Please start my subscription from the ..... issue

UK Addresses: ☐ 26 issues at **£9.95** ☐ 52 issues at **£19.95**
Overseas Addresses: ☐ 26 issues at **£18.70** ☐ 52 issues at **£37.40**
Please tick relevant box
I enclose my cheque to *Popular Computing Weekly* for .....

**Name** .....

**Address** .....

.....

.....

Please send this form, and cheque, to *Popular Computing Weekly*, Subscription Dept., 12-13 Little Newport Street, London WC2R 3LD.

# martech games ...a spectacular range of software

## BLASTERMIND!

SPECTRUM 48k £5.50

At first glance this might seem to be just another version of a very popular game. How wrong can you be!!! True, the start is simple enough. The Spectrum picks a code of numbers or colours with a selection of levels of difficulty — and invites you to do the same. You then take it in turns to guess each others code from the clue supplied after each guess. An extremely well written, fast and very clearly displayed game, with almost inevitable defeat.

This was exactly as intended but unfortunately *something went wrong*. During the programming strange uncomplimentary messages began to appear on the screen. At first they were so few they were not taken too seriously, but soon they could no longer be ignored. Somehow the Spectrum had been given a personality — a rather devious, supercilious, dislikeable, hateful, horrible mind.

Side B contains a version of the game compatible with the excellent Currah µSpeech unit — even worse!!

## The Quest of Merravid

VIC 20 (16k) £7.95 or Commodore 64 £7.95

A really challenging and enjoyable adventure, written by a confirmed adventure addict who grew tired of the ease with which he solved other adventures himself. Will accept and act on sentences containing up to nine words.

The adventurer becomes Merravid, charged with the task of finding, taking and then returning the magic Firestone of the Dwarves. However, overcoming the many novel and original hazards is no easy matter. Careful and imaginative thought is required if progress is to be made and the Firestone tracked down to the lair of the Dragon of Thargon. Even then the Dragon has to be defeated and the stone retrieved. A compulsive, extremely enjoyable and very user friendly adventure.

## COMPUTER MODERATED BOARD GAMES

**The original and completely unique two player games of cunning and strategy, strictly for more demanding games enthusiasts.**

- **CONFLICT** — a full scale military and economic battle demanding clear thought and decisive action.
- **GALAXY CONFLICT** — a complex battle for control of the Universe.

Each game:—
ZX81 (16k) and SPECTRUM (48k) **£11.95**
BBC 'B', CBM-64, ATARI 800 **£14.75**

*Attractively boxed containing cassette, full size board, pieces, maps, and full instructions.*

**Ideal Christmas Gifts!**

*Most games available from leading retail outlets.*

*Prices include VAT, Post and Packing*

Mail order to: MARTECH HOUSE, BAY TERRACE, PEVENSEY BAY, EAST SUSSEX BN24 6EE
Telephone: (0323) 768456 Telex: 87465 EXIM Brighton

# His master's voice sounds from Commodore

COMMODORE will launch its long-awaited *Magic Voice* speech synthesiser unit in January, priced around £50.

The small hardware add-on plugs into the expansion port on the Commodore 64. Software held in Rom inside the unit gives it a vocabulary of 234 words and letters which, with the exception of Z (Zee), are pronounced in an acceptable mid-Atlantic accent.

As well as the complete alphabet and the numbers 1 to 12 a selection of phonetic sounds are included to enable new words to be built up.

The unit is controlled from Basic with the simple command *Say* "X".

A number of 'speaking' Rom cartridge programs are planned to accompany the Magic Voice. These plug into a cartridge port on the top of the unit. Among these are the *Magic Garden* and *Magic Toolbox* educational series of talking books from Edata, the *BJ Bear* educational programs, two arcade games *Wizard of Wor* and *Gorf* and *Magic Desk 2*.

## Atari future

**Continued from page 1**

take-over of Warners' film and cable interests, Atari could be sold off to a European electronics conglomerate. Warners would still retain its music and book publishing interests.

Both Thorn EMI and Philips have been mentioned as possible buyers of Atari, with the latter being the more likely candidate. The Dutch electronics giant Philips has so far failed to make any real impact in the computer and video games market. Sales of its G7000 video games machine come a poor third behind Atari's own VCS and Mattel's Intellivision.

Speculation that Philips might take over Atari has been increased by the announcement in July that Warners and Philips plan to merge their record music interests.

Philips at present has a 50 percent stake in Polygram. The other half is owned by the German company Siemens. Two new companies are to be formed between Polygram and Warners in which Siemens is to hold a considerably reduced interest.

Commenting on suggestions of a Philips take over of Atari, Graham Clark, managing director of Atari UK said: "I am aware of the speculation but it would appear to be the result of confusion with the Philips-Warner record deal.

"Any take-over of Atari would seem very unlikely from what I know."

# Dragon 'poke' runs into problems

DRAGON software houses selling programs which use the so-called 'speed-up *Poke*' are running into problems of software incompatibility.

In earlier versions of the Dragon 32, the command *Poke 65495,0* (Hex: HFFD7,0) can be used to increase the operating speed of the Dragon's 6809E processor. A number of software houses have taken advantage of this fact to make their games run faster.

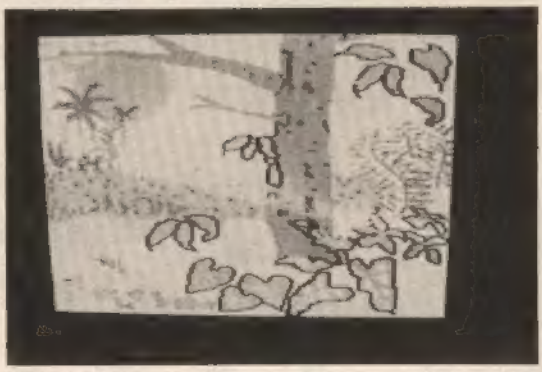
The problem is that around 20 percent of Dragons now being produced will not accept the speed-up *Poke* command and therefore the games will not run. Among the programs affected are Beyond Software's *Up Periscope* and C-Tech's *Flight Simulation*.

The Dragon's 6809E processor is rated at a maximum operating clock speed of 1MHz and runs in normal use at 0.98MHz. The speed-up *Poke* increases the clock rate to 1.8MHz. It then depends on the tolerance of individual chips whether a particular machine will accept the *Poke* command.

One company which has found a solution to the problem is Microdeal. Its programs offer a menu choice at the start of each game where the Dragon owner can choose to play a version either with or without the speed-up *Poke*, depending on whether or not the Dragon concerned will accept it.

Dragon's Cathy Hyde says: "We do not recommend that Dragon users use the *Poke* because we cannot tell what long-term harm it will cause the machine. It is not just the Dragon's processor which has been designed to run at 1MHz, but the whole design of the computer. The peripheral interface adaptor which communicates with the keyboard and parts of the Ram have also been designed to work best at less than 1MHz."

## Paintings by numbers



*KOALA Painter, from Audiogenic, is a graphics tablet for the Commodore 64. Consisting of a tablet and stylus, disc-based software and manual, it enables users to draw directly on to the screen.*

*There are facilities for selecting colour, creating mirror images, copying one part of a picture to another and erasing mistakes. The user can choose between eight brush sizes and 16 colours.*

Koala Painter *costs £89.95 including VAT from Audiogenic, PO Box 88, Reading, Berks RG1 2SN.*

## Little new at ZX fair

*THE eleven and a half thousand visitors to the 9th ZX Microfair on December 3 and 4 found little new hardware or software on display.*

*Apart from East London Robotics' demonstration of its revolutionary new Trick-Stick Spectrum joystick, interest once again centred around new Spectrum software.*

*Richard Shepherd showed a new adventure by* Invincible Island *author Peter Cooke* – Urban Upstart.

Silversoft, which has been rather quiet in recent months, had three new titles — Freez' Bees, Robot Riot *and* Sam Spade.

*Microsphere displayed a new 48K game,* Wheelie.

*Adventure house Phipps Associates launched its first arcade titles* – House of the Living Dead, Killer Knight, *and* Loony Zoo.

*And Gilsoft offered a new adventure written using its games-designer program* The Quill — Magic Castle.

*One trend that is very noticeable with recent shows is that increasingly the Microfairs are becoming dominated by retail exhibitors. More and more software shops are attending, with fewer and fewer of the software houses choosing to show.*

## Rotten apples

APPLE, continuing its fight against counterfeit 'rotten' Apples, last week failed in an attempt to ban the sale of Taiwanese-made copies of its Apple II in Australia.

An Australian court ruled that the two machines — the Apple II and The Wombat — were clearly distinguishable by their names and that the Wombat distributor was not guilty of misrepresentation.

# REVENGE

OF THE MUTANT CAMELS

ASTOUNDING GAME · ASTOUNDING COMPETITION

**FIRST PUBLIC APPEARANCE: DEC 16 COMPUTER FAIR (WEMBLEY)**

## BE THERE

GET YOUR REVENGE!

FOR COMMODORE 64 PLUS JOYSTICK

REVENGE

OF THE MUTANT CAMELS

BY JEFF MINTER FROM LLAMASOFT

**£7.50**

Llamasoft

# US Viking for Dragon

DRAGON has continued to follow its American software path with the launch of seven Dragon 32 titles, all previously available in the US for the Tandy Color Computer.

The licences have been agreed by Dragon with a number of US Tandy houses — Softlaw Corporation (*Cimeeon Moon*), Computerware (*Bloc Head* and *Synther 7*), Prickly Pear (*Viking*, *Shaft* and *Tee Off*) and Spectral Associates (*Whirlybird Run*).

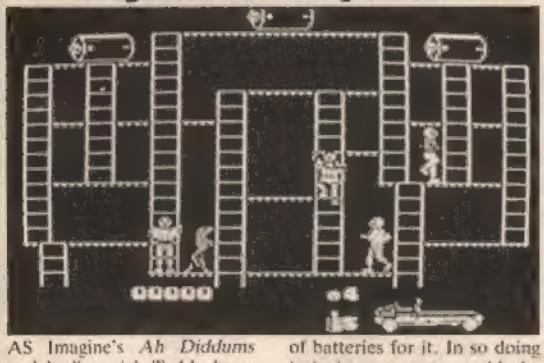
"We have had to go to the States because the 6809 chip, around which the Dragon is based, has been rather neglected in the UK. Good software in this country is either written for the Z80 or 6502 processor," commented Dragon's Clive Johnson.

Pricing of the new titles is related to the level of royalty payment Dragon has agreed for the titles. *Whirlybird Run* from Spectral Associates costs as much as £12.95 for a single cassette title.

"It is difficult to get in contact with good individual writers and by going to established US software houses we can tap into their authors," said Clive.

At present there are no plans for any of the American companies to write material specially for the Dragon: "It wouldn't be worth their while, when they can write for both the Dragon and Tandy machines at once," he added.

# Teddy bear's picnic



AS Imagine's *Ah Diddums* and Audiogenic's *Teddy* show, bears are in vogue.

After Christmas, Artic programmer John Ritman — author of 3D Combat Zone — will continue the trend with *Bear Bovver*, his new game for the 48K Spectrum.

As Ted the bear you must leave the security of your electric car and climb a series of ladders to drop down a new set of batteries for it. In so doing it is important to avoid the bovver bears and their strange-looking pet.

John says: "It's a tactical arcade game. You can either run straight for the batteries and try to get through as many screens as you can or you can deliberately try to group the bears on a battery when you drop it — you get really high scores for that."

# Byting back

*MICRO Format is offering a useful new type of add-on – the Byte Bat.*

*The 17 inch-long foam rubber baseball bat is ideal for those occasions when you just cannot stand it any more – and wish to take out your programming frustrations on your micro.*

*More details from Micro Format, 1271 West Dundee Road, Suite 16A, Buffalo Grove, Illinois 60090, USA. The Byte Bat costs $9.95 (about £7) excluding postage and packing.*

## IBM contract

AB Electronics, manufacturer of Acorn's BBC and Electron micros, has won a multi-million pound contract to supply parts for the IBM Personal Computer.

IBM refused to disclose details of the contract, but AB admitted it was its biggest deal yet. Some indication of the size of the contract can be seen from AB's turnover — nearly £40m this year.

# Business and accounts

GEMINI has announced a range of software titles for serious micro users.

The five packages provide home business, accounting, and mail handling programs.

*Combination Home Pack 1* contains *Database*, *Home Accounts*, *Mailist*, *Spreadsheet Analysis* and *Graphplot* for the Electron (on cassette) and BBC (on cassette, 40- or 80-track disc) machines priced at £79.95.

*Combination Home Pack 2* contains *Database*, *Home Accounts*, *Graphplot* and *Mailist* for the 48K Spectrum (on cassette) priced at £59.95.

The other three titles are *Combination Business Packs 1* to *3*, the first two for the BBC machine and the last for the Electron, featuring more advanced versions of the programs in the *Combination Home Packs*.

From February 1, the complete range of business and utility programs will be available for the Commodore 64 computer.

Details from Gemini Marketing, 18a Littleham Road, Exmouth, Devon.

## Mattel shows no improvement

MATTEL, the US toy and video game giant, is continuing to show big losses.

Despite dropping its Aquarius microcomputer and announcing its intention to withdraw completely from the highly competitive home computer market, Mattel has recorded a substantial third quarter loss of $46.3m. A healthy profit in its toy division was more than cancelled out by an $82.4m. loss in its electronics and computer division.

# screenplay

134 St. Vincent Street, Glasgow G2 5JU. Telephone 041-248 2481

**CHICKAROO:** A word recognition game for children. Find the missing letter is the name of this game which can be used by up to four players.

**PIRATES:** A childrens game based on word recognition. Identify the concealed word before you reach the end of the plank or else face the perils of the deep.
A vocabulary of 100 words is supplied with both of these games, however, parents have the option of adding their own data files.

**BBC EDUCATIONAL**

**THE ILLUSTRATOR:** A graphics design package which can be used in a graphics Modes 1 or 2 to generate full colour illustrations on the screen of your micro. This package allows graphics and text to be mixed on screen and saved on tape for later use.

**MAD MONTY:** A fast and furious version of the snake in the garden game for the MODEL B BBC MICRO. Monty — the well known python — lives in a garden inhabited by juicy flowers. Help him munch his lunch but mind those rocks and walls!

**BBC GAMES AND UTILITIES**

**MAD MONTY:** It's mealtime for MONTY the MAD python and frogs are on the menu! Guide him round the garden gulping frogs and munching magic mushrooms — beware those toadstools and if you keep your cool mouse may be on the menu.

**THE ANIMATOR:** The perfect DRAGON graphics tool allows you to define your own characters and then make them spring to life on the screen. The animated routine can then be saved on tape and combined with others to create your own games.

**DRAGON 32**

**MAD MONTY:** This version of the snake game has 7 screen layouts and five speeds from sublime to ridiculous. Monty munches frogs for lunch and is partial to the odd mouse for afters.

*COMING SOON:* Complete machine code toolkit for the 64. Assembler, Disassembler, Monitor, Hex dump.

**COMMODORE 64**

## SCREENPLAY SOFTWARE MORE FUN THAN GAMES

Our range of software includes games but we believe that your micro should do more than test your reflexes. For example, **CHICKAROO** and **PIRATES** are educational products designed to help you extend your childrens' vocabulary.
**THE ILLUSTRATOR** turns your TV screen into an electronic canvas. The only limit is your imagination.
**DRAGON** users are you bored with other people's games? Let **THE ANIMATOR** help you create your own.

*LIBERATE YOUR MICRO WITH SCREENPLAY SOFTWARE*

| BBC | TICK | PRICE |
|---|---|---|
| CHICKAROO | ☐ | £7.95 |
| PIRATES | ☐ | £7.95 |
| THE ILLUSTRATOR | ☐ | £9.95 |
| MAD MONTY | ☐ | £7.95 |
| **DRAGON 32** | | |
| THE ANIMATOR | ☐ | £9.95 |
| MAD MONTY | ☐ | £7.50 |
| **COMMODORE 64** | | |
| MAD MONTY | ☐ | £6.50 |

Please send me the products I have marked.
Send to:

Name .....

Address .....

.....

.....

I enclose Cheque/P.O. to the value of £ .....
made payable to Screenplay.

**SCREENPLAY, 134 St. Vincent St., Glasgow G2**

***ALLOW 14 DAYS FOR DELIVERY.***

## Storage solution

For those of us lucky enough to own a Sinclair Microdrive, there is the slight problem of the storage of cartridges which are about 1/8 the size of the ugly old tape cassettes.

My suggestion is to use the lid (the clear plastic half) of an empty cassette box. After all, we have plenty of spare tapes now we can store so much on a tiny cartridge.

Stand the cassette box lid on its edge to form a tray with a high back and stand your Microdrive cartridges in it. The lid will stand on a working surface or the back can be glued to the edge of a shelf. Leave the insert sheet in for an index record.

Yours, one of the chosen few.

*Vic Phillips*
*17 Elizabeth Avenue*
*Ibstock*
*Leicester*

## Computer loonie

I would like to know if anyone could help out a poor old computer loonie. I want a *Phoenix*-type game for the Commodore 64 — it must have the full five screens.

Can anyone help before I crack up? Could you also let me know the company, etc. Help!

*Mark Roebuck*
*59 Ings Walk*
*South Kirkby*
*Pontefract*
*W Yorkshire*

**I am afraid that I don't know of any *Phoenix* games for the Commodore 64, but I am sure they must exist. Perhaps our readers will be able to supply some details.**

## Ace club

Re Phil Murray's letter of December 1. The Jupiter Ace Users Club is alive and well, has over 350 members, and is just about to issue its fourth newsletter. We welcome new members and suggest Phil writes to us. Subscription is £7 for 1984. Newsletters 1-4 cost an additional £7. Cheques payable 'Remsoft'. Here endeth the commercial.

Now that Jupiter have gone down the plughole, it's even more necessary for Ace users to stick together and share information.

By the way, the new Forth computer from Microkey is set for launch in January. It doesn't replace the Ace, merely complements it (128K, 3½" Sony drives, good keyboard, interfaces, etc . . .).

*John Noyce*
*Remsoft*
*18 George Street*
*Brighton BN2 1RH*

PS. Yes, I've met the theoretical ideal language types (re Jeremy Ruston's article). They're a pain. Forth is a lot more versatile than people give it credit. But even so, it's horses for courses.

## Microdrive problems

Andrew Pennell and friend are not the only people to have experienced difficulties with the new Sinclair Interface 1 and Microdrive. In my own case both worked perfectly, with no sign of any problems, until a month had passed. At that point I'd either get a syntax error when attempting to initiate a Microdrive *Save* or *Load* command into the computer directly or a 'Nonsense in Basic' message when trying from within a program.

Sinclair have now replaced my Interface 1 (no 12) with another issue 2 (no 422). Unfortunately, I haven't really been able to check whether this works correctly as last week my Spectrum gave up the ghost after I plugged in Interface 2!

What concerns me about the whole situation is that we Spectrum Issue 1 owners have waited over a year for the much promised Microdrive. Are we now to discover that the useful life of a Spectrum is only just longer than that period?

*Ian Maule*
*5 Beaconsfield Road*
*New Malden*
*Surrey KT3 3HY*

*"Any truth in the rumours about Rupert Murdoch and Warner Communications? . . ."*

## Rom omission

Thank you for forwarding Gareth Rowland's letter, as it highlighted an omission in my article in the 20-26 October issue on making Rom calls. There should be eight steps, not seven! If *step 3.5 "STX >$A6"* is not included, the technique will not work. I apologise for the frustration this will have caused people. The eight steps should be as follows:

```
1) Create tokenised BASIC
   line.
2) LDX >$R6: PSHS X
3) LERX @LINENAME,PCR
4) STX >$R6 -missing step
5) LDR ,X
6) ANDCC #$FE
7) JSR 12345 (or whichever)
8) PULS X: STX >$R6
```

*Peter Whittaker*
*Cambridge*

## Interrupt mistake

With regard to the use of interrupts on the Spectrum by Alan Went (*PCW* 24-30 November).

The general article was very interesting, but he made a basic mistake in assuming that during the interrupt acknowledge cycle the data bus would contain 255 decimal. Although the data received will normally be 255, this is not always true. The actual value can be anywhere between 0 and 255, the problem being that some add on units do not decode the *Ioreq* and *Read* lines correctly.

Also, there are no true pull up resistors on the data bus which rely on the pull up effect of the memory devices, etc, to ensure 255 — this cannot be guaranteed to work.

To ensure that the interrupt will respond as required, it is necessary for it to work no matter what value is returned. To do this, we must set aside 257 bytes for an interrupt vector table. Each byte of this table contains the same value such that no matter what value is added to the *I* register we always jump to the correct address (257 bytes are needed, as the first byte of the vector address could be at the 256th byte ie returns 255).

In my 48K Spectrum I use *Feh* (254 dec) as the value stored in the table. This means that the interrupt address is at *Fefeh* (65278 dec). The vector table is placed at address *Fdooh* to *Feooh* (64768 to 65024 dec).

The use of the *I* register at *FDH* does not cause any 'snow' on the screen, as this only happens between *40H* and *7FH*, the memory for the 16K Spectrum. But, this does cause problems for 16K owners who are unable to use this technique. The accompanying brief routine will set up the interrupt.

Anyway, thanks for an interesting magazine, keep up the good work.

*D Allday*
*Lyans*
*Rusper Road*
*Ifield*
*Crawley*
*Sussex RH11 0LR*

```
Address   Data      Code          Remarks
FE56      F3        ON  DI        ;ensure interrupt does
                                  ;not occur during change
FE57      2100FD        LD HL,0FD00H ;set table
FE5A      0600          LD B,0
FE5C      36FE    LOOP LD (HL),0FEH
FE5E      23            INC HL
FE5F      10FB          DJNZ LOOP
FE61      3EFD          LD A,0FDH ;set I register
FE63      ED47          LD I,A
FE65      ED5E          IM 2      ;Set interrupt mode
FE67      FB            EI
FE68      C9            RET

FE69      ED56    OFF IM 1    ;turn off special
FE6B      C9            RET     ; reset to orig mode
                                ( no need to reset I reg.)

FEFE      Interrupt routine starts here.
```

# Abandon Earth

**A new game for the unexpanded Vic20 by Mark Manns**

As the last remaining computer on the remains of the planet Earth, after the great galactic battle of 2056 AD, it is your job to get the last remaining scientists (4) to the awaiting mother ship. But it's not as easy as it seems. Not only does the mother ship move from left to right across the top of the screen, but there are also asteroids, aliens and space mines to stop your progress.

This game for the unexpanded Vic20 loads in two parts. The first part contains the instructions and the data for the graphics. The second part contains the main program. (This game uses joystick.)

**Variables**

| | |
|---|---|
| TI | —TIME |
| SC | —SCORE |
| LI | —LIVES |
| COL | —COLOUR |
| BP | —FIRE |
| BC | —FIRE |
| M | —MOVE MOTHER SHIP |

**Program notes**

| | |
|---|---|
| 0-10 | VARIABLES |
| 10-16 | MAIN ROUTINES |
| 99-1067 | SET UP SCREEN |
| 3999-4050 | LAUNCH MEN |
| 6000-6016 | JOYSTICK CONTROL |
| 8000-8007 | FIRE |
| 10000-10006 | MOVE MOTHER SHIP |
| 20000-20011 | ENDING ROUTINE |
| 29999-30010 | DETECTION + SCORING |

```
10 REM****************
11 REM*MAIN  GRAPHIC*
12 REM*              *
13 REM*   ROUTINE    *
14 REM*              *
15 REM*     BY       *
16 REM*              *
17 REM* MARK  MANNS  *
18 REM*              *
19 REM****************
20 REM*              *
21 REM*     DATA     *
23 REM*              *
24 REM****************
25 REM*LINE          *
26 REM*              *
27 REM*103-108-SHIP  *
28 REM*              *
29 REM*109-LASER     *
30 REM*              *
31 REM*110-BEAM      *
32 REM*              *
33 REM*112-MAN       *
34 REM*              *
35 REM*113-LANDER    *
36 REM*              *
37 REM*114-PHASER    *
38 REM*              *
39 REM*115-ASTEROID  *
40 REM*              *
41 REM*116-ALIEN     *
42 REM*              *
43 REM****************
45 POKE36879,106
46 PRINT"■■"
47 PRINT"■╱╲ ┌┐ ╱╲ ╲ │┌╲ ┌┐ ╲ │"
48 PRINT"■└┘ ┌┐ └┘│││ ││ │││
49 PRINT"■ │└┘│ ││╲└╱ └┘│╲"
50 PRINT"■■"
51 PRINT"■┌─ ╱╲ ┌┐ ┬ │ │"
52 PRINT"■└─ └┘ └┘ │ │ │"
53 PRINT"■  │ │╲  │ ┌┐"
54 PRINT"■└─ │ ││╲ │ │ │......"
55 PRINT"■■■*****USE JOYSTICK*****"
56 FORT=1TO2000:NEXTT
57 PRINT"■":POKE36869,255
58 PRINT"■    POINTS    "
59 GOSUB101
60 PRINT"■■■ U ■---- 100 PTS."
61 PRINT"■■■ V ■---- 500 PTS."
62 PRINT"■■■ R ■----1000 PTS."
63 PRINT"■■■■HIT A KEY"
64 GETR$:IFR$=""THEN64
65 PRINT"■"
66 POKE36869,240
67 PRINT"■YOU MUST EVACUATE THE LAST REMAINING"
68 PRINT"NUCLEAR PHYSICIST FROM EARTH,"
69 PRINT"TO AN AWAITING        SPACESHIP"
70 PRINT"BUT DUE TO THE GLACTIC WAR BETWEEN ALPHA    CENTURI AND THE TERRANS"
71 PRINT"LARGE ASTEROIDS AND   SPACE MINES BLOCK YOUR PROGRESS"
72 PRINT"■WATCH OUT, THE        CENTURIANS HAVE HIRED ALIENS"
73 PRINT"TO EAT YOUR MEN AS YOU FIRE THEM OUT INTO   SPACE."
74 FORT=1TO9000:NEXTT
75 PRINT"■"
76 PRINT"■■****CONTROLS****"
78 PRINT"■■YOU CONTROL THE       LAUCHER AT THE BOTTOM OF THE SCREEN"
```

```
79 PRINT"YOU CAN FIRE USING THE RED BUTTON"
80 PRINT"BUT WATCH OUT THE       LAUCHER USES THE     LATEST"
81 PRINT"ANTI-MATTER BEAMS      WITCH PASS  THROUGH   THERE TARGET TO HIT   MORE
"
82 PRINT"TO LAUCH  ONE OF THE  FOUR SCIENTIST PULL   BACK ON THE JOYSTICK"
88 FORT=1TO8000:NEXTT
99 GOTO121
101 POKE56,28:POKE52,28
102 FORT=7168TO7168+184:READA:POKET,A:NEXT
103 DATA0,0,0,0,0,1,3,7,0,0,0,0,0,255,255,255
104 DATA1,3,15,15,255,255,255,255,128,192,240,240,255,255,255,255
105 DATA0,0,0,0,0,128,192,224,15,31,63,255,31,31,15,15,255,60,60,255,255,255,25
5,255
106 DATA255,204,204,255,255,255,255,255,240,248,252,255,248,248,240,240,7,7,3,3
1,1,0,0
107 DATA192,192,128,128,128,0,0,0,7,7,7,0,0,0,0,0,224,224,224,0,0,0,0,0
108 DATA3,3,1,1,0,0,0,0,224,224,192,192,128,128,0,0
109 DATA0,42,42,255,42,42,0,0,0,84,84,255,84,84,0,0
110 DATA34,85,85,149,8,0,0,0
112 DATA0,28,28,8,62,8,20,34
113 DATA0,24,24,36,66,255,255,54
114 DATA0,0,16,16,16,16,0,0,0
115 DATA56,126,255,126,254,248,60,
116 DATA126,90,255,189,189,36,66,36
120 FORI=7424TO7431:POKEI,0:NEXT:RETURN
121 PRINT"LOAD "
160 POKE198,3:POKE632,19:POKE633,13:POKE634,13

0 REM****VARIBLES****
1 A$="
2 D$="":V=0:M=0:TI$="000000":COL=30720:SC=0:YT=0:GO=0:S=0
10 REM****MAIN ROUTINE****
11 GOSUB100
15 GOSUB6000
16 GOSUB10000
17 IFV=1THENM=M-1:GOSUB10000
18 IFV=2THENM=M+1:GOSUB10000
20 PRINT"TIME:";RIGHT$(TI$,3)
21 PRINTTAB(10)"SCORE ";SC
29 REM****SET UP PHASES****
30 IFTI$>"000199"THEN60000
40 IFTI$="000100"THENPOKE36879,8:ZX=10:S=1
41 IFTI$="000125"THENPOKE36879,42:ZX=5
42 IFTI$="000145"THENPOKE36879,27:S=0:ZX=20
43 IFTI$="000155"THENPOKE36879,93:ZX=5:S=0
50 GOTO15
99 REM****SET UP SCREEN****
100 POKE36869,255:POKE36879,CR
1000 PRINT"":FORT=8164TO8185:POKET,230:POKECOL,230:POKET+COL,6:NEXT
1002 DEFFNR(X)=INT(RND(1)*X+1):FORI=1TO50:A=FNR(395)+7702
1003 POKEA,174:POKEA+30720,FNR(6):NEXT
1040 PRINTA$TAB(11)"S"
1045 FORI=1TO20:A=FNR(40)+7834:POKEA,171:POKEA+COL,FNR(6):NEXT
1050 FORI=1TO35:A=FNR(100)+7966:POKEA,21:POKEA+COL,INT(RND(3)*8):NEXT
1052 FORI=1TOINT(RND(1)*20):A=FNR(40)+7834:POKEA,22
1053 POKEA+COL,FNR(6):NEXT
1055 PRINT"
1056 PRINT"
1057 IFLI=4THENPRINT"RR RR ":RETURN
1059 IFLI=3THENPRINT"R  RR "
1061 IFLI=2THENPRINT"   RR "
1063 IFLI=1THENPRINT"   R "
1065 IFLI=0THENPRINT"     ";
1067 GOTO4000
1070 AA$="ALL YOUR MEN HAVE GONE":GOTO20000
1080 END
2000 AA$="YOU HIT YOUR SHIP     SO IT FIRED BACK."
2001 GOTO20000
```

# HEWSON CONSULTANTS

# 4 SUPERB FLIGHT SIMULATORS

**NIGHTFLITE II**
New all machine code version of our highly successful flight simulator. Now with perspective cockpit view, improved instruments, detailed map, four beacons and other enhancements. Multiple levels of play to develop your flying skills. Complete with printed flight debrief at the end of your flight — signed by the program author. The most realistic simulator on the market. 16K or 48K Spectrum. **£7.95**

**BBC NIGHTFLITE**
Take the controls of your computer and fly by night over mountains to a safe landing. Take off, bank left and right, navigate between beacons, adjust the flaps and the rudder. A careful simulation of the deliberate operation of flying a plane. Unrealistic speeds and altitudes cannot occur because your plane will crash.
BBC Model B **£6.95**

**DRAGONFLY**
Hi Res Real Time flight simulation. Two runways, take off, bank, adjust trim, navigate between beacons and land. Superb cockpit display ☒ dials and readouts.
Instruments, Alt., ASI, VSI, AH, ILS, TS, RPM, GAS, TEMP, HDG, BCN, BRG, FLAP and GEAR. Simply the BEST flight simulator for the Dragon. **£6.95**

**PILOT**
Fly your ZX 81. Take off, climb, bank, adjust engine RPM. Navigate between beacons. Instruments include A/H, ALT, HDG, FLAP, GEAR, VOR, VSI, WIND, DME, ADF, and ILS. **£5.95**

**ALSO HEATHROW AIR TRAFFIC CONTROL**
For the 16K Spectrum.
YOUR TASK: ☒ direct incoming aircraft from holding stacks to runway — smoothly, safely and expeditiously.
YOUR INSTRUMENTS: Radar screen showing aircraft call signs, blips and trails. Four stack displays giving altitude, heading, speed and size. **£7.95**

*Available from:*
BOOTS
JOHN MENZIES
SPECTRUM
*and all leading micro computer software retailers.*

*Distributed by*
Micro Dealer
Personal Computer Services
Computer Bookshop
Lightning
Wynd-Up
Leisuresoft
Websters
Mapsoft

**ALWAYS LOOK FOR THE HEWSON LOGO . . . THE MARK OF *THE BEST* SOFTWARE**

```
3999 REM****LAUNCH MEN****
4000 IFYT>4THEN1070
4004 MI=8120+X+1:NI=MI+COL
4005 GOSUB10000
4006 GOSUB30004
4007 POKEMI,Q:POKENI,0
4009 MH=5:GOSUB6000:MH=0:POKEMI,32
4011 MI=MI-44:NI=NI-44:IFMI<7768THENRETURN
4012 GOTO4005
4050 END
6000 REM****JOYSTICK****
6001 POKE37137,0:POKE37154,127
6002 U1=PEEK(37137):U2=PEEK(37152)
6003 IF(U1AND4)=0ANDMH<>5THENYT=YT+1:LI=LI-1:Q=18:GOTO1055
6008 IF(U2AND128)=0ANDX<18THENX=X+1:GOTO6500
6010 IF(U1AND16)=0ANDX>3THENX=X-1:GOTO6500
6013 IF(U1AND32)=0ANDGH<>5THEN8000
6016 RETURN
6500 PRINTA$;TAB(X)" S "
6509 RETURN
6900 POKEBP,8:POKEBC,10:POKE36877,190:FORI=15TO0STEP-.2
6901 POKE36878,I+144:NEXT:POKE36877,0:POKE36878,■:POKEBP,32
6909 RETURN
7999 END
8000 REM****FIRE****
8001 BP=8120+X+1:BC=BP+30720
8002 GOSUB30000
8003 POKEBP,20:POKEBC,S
8005 GH=5:GOSUB6000:GH=0:POKEBP,32
8006 BP=BP-44:BC=BC-44::IFBP<7702THENRETURN
8007 GOTO8002
8900 REM
10000 REM***MOVE MOTHER SHIP***
10001 PRINTD$;TAB(M)" @ABCAD ■■■■■■■■■■ EFGGFH ■■■■■■■■■■ IJKLMN "
10002 FORT=1TOZX
10003 IFM<1THENV=2
10004 IFM>14THENV=1
10005 POKE36878,15:POKE36876,220:FORL=1TO5:NEXTL:POKE36876,0:POKE36878,0
10006 RETURN:END
20000 POKE36878,15:FORXX=15TO0STEP-3:POKE36880,RND(1)*3+11:POKE36881,RND(1)*2+3

20001 POKE36877,160+XX:FORDE=1TO10:NEXTDE,XX:POKE36877,0
20010 PRINT"■■":POKE36878,8
20011 GOTO40000
28888 END
29999 REM**SCREEN DETECTION**
30000 IFPEEK(BP)=21THENSC=SC+100:GOTO6900
30001 IFPEEK(BP)=171THENAA$="■■■YOU HIT A MINE":GOTO20000
30002 IFPEEK(BP)=120RPEEK(BP)=130RPEEK(BP)=14THEN2000
30003 IFPEEK(BP)=22THENSC=SC+10:GOTO6900
30004 IFPEEK(MI)=90RPEEK(MI)=100RPEEK(MI)=11THENSC=SC+1000:GG=GG+1:GOTO6000
30005 IFPEEK(MI)=120RPEEK(MI)=13THENSC=SC+1000:GG=GG+1:GOTO6000
30006 IFPEEK(MI)=21THENSC=SC-100:Q=32:RETURN
30007 IFPEEK(BP)=110RPEEK(BP)=100RPEEK(BP)=9THEN2000
30008 IFPEEK(MI)=171THENQ=32:AA$="■■■YOU HIT A MINE":GOTO20000
30009 IFPEEK(MI)=22THENQ=32:SC=SC-1000:RETURN
30010 RETURN
39999 REM****END ROUTINES****
40000 REM
40001 POKE36869,240:POKE36879,8:PRINT"■■"
40002 PRINTAA$
40003 PRINT"■■■BUT YOU GOT ";GG;:PRINT"OF YOUR■4 MEN SAFTLY OUT"
40004 PRINT"■■■AND SCORED",SC;:PRINT" PTS."
40005 PRINT"■■■IN A TIME OF ";RIGHT$(TI$,3)
40008 FORT=1TO5000:NEXTT:PRINT"■"
40010 POKE36879,27
40011 END
50000 AA$="YOUR TIME IS UP":GOTO20000
```

# TURN YOUR PROGRAMME UPSIDE DOWN

**Now you can add another dimension to your games. Swap direction, swap functions, confuse your friends. In fact you can add almost any twist to your games with Stonechip's Programmable Joystick Interface.**

**You can also listen to them with Stonechip's Echo Amplifier.**

**Programmable Joystick Interface.** This also enables any Spectrum software ■ be used with a joystick, irrespective of which keyboard keys have been chosen for function.

Programming ■ easy using only a single switch. Switch one way to program and another way to play. No tapes to load or links to worry about — all programming is achieved by hardware. Used with Atari-compatible joysticks. Simply plugs into rear expansion port of ZX-Spectrum. No other connections to make, no additional power supply required.

**Echo Amplifier.** How would you like to listen to the sound output from your ZX-Spectrum without ear strain? The Stonechip Echo amplifier can do this for you as well as easing the tedium ■ saving or loading of tapes and enlarging the range of tape recorder compatibility with the computer. The amplifier has volume control over a range adequate for most uses, and a tone control for harsh or mellow sounds. A switched interface removes the need to swap leads during 'SAVE'ing or 'LOAD'ing. Leads are left connected all the time and the desired function is selected on the three position switch by the user. Use of the 'CUE' facility enables an audio cue to precede the program being 'SAVE'd on tape, a decided advantage when searching through a multi-program tape. The Echo simply plugs into the Ear, Mic and Power sockets of the computer and does not require an additional power supply. The expansion port at the rear of the computer ■ left free for use with other peripherals and the unit is housed in an attractive case custom designed to complement the ZX-Spectrum.

STONECHIP ELECTRONICS

Stonechip Ltd, Brook Trading Estate Deadbrook Lane Aldershot Hants GU12 4XB Tel:(0252)38260

To: Stonechip Electronics, Unit 9, The Brook Industrial Estate, Deadbrook Lane, Aldershot, Hants.
Telephone: (0252) 318960

Please forward me the following products:

All prices are inclusive of VAT, Post & Packing for U.K. deliveries (overseas add 15%)

Name .....

Address .....

DEALER ENQUIRIES WELCOME
Delivery normally 14 days

## New from SUNSHINE

# Master your ZX Microdrive

**programs, machine code and networking by Andrew Pennell**

Master your ZX Microdrive contains all the information you will ever need to use the ZX Microdrive to the full. Clearly explained, with many examples, it is equally suitable for the relative newcomer to BASIC through to the experienced machine code programmer.

ISBN 0 946408 19 X

Andrew Pennell has also included a [illegible] database file handling program to let you put the ZX Microdrive to practical use with your Sinclair Spectrum.

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores. Dealer Enquiries: 01-437 4343

Please send me

☐ Master your ZX Microdrive at £6.95 each

I enclose cheque/postal order for £ _____ made payable to: Sunshine Books: 12-13 Little Newport St., London WC2 3LD.

Or phone your order through on Access Mastercard 01-437 4343

Name _____

Address _____

_____

Signature _____

We can normally deliver in 4-5 days.

## NOW FOR THE 48K ZX SPECTRUM
## MULTI-COLOURED SPRITE-GRAPHICS

**A new UTILITY program: Replace User Defined Graphics with Multi-Coloured Sprites and greatly improve your games.**

**FEATURES:**
Demonstration program : Character Generator program Instruction program.
Create any size characters up to full screen
Choose colour, bright and flash for each character square.
Save character data : Create animated characters
Beginners guide on how to use Sprites.

Remarkable Machine code routine prints Multi-Coloured Sprites instantly
Unprints Sprites Fully restoring background

**Only £6 including p&p.**

**From: B. SIDES SOFTWARE**

4 Willesden Road, Cefn-Glas, Bridgend, South Wales CF31 4RE

## POPULAR Computing WEEKLY Back Issues

Almost all the copies of PCW that you missed can still be bought as back issues for only 50p, including postage and packing.

An **Index** of the contents of the 26 issues published in 1982 is now available from the Publishers for only £1.20. It includes full details of all the programs, routines, reviews and news that you might have missed.

Please send me the following back issues at 50p each

_____ Total £_____

Please send me a copy of the 1982 PCW Index at £1.20

I enclose a cheque postal order for £ _____

Name _____

Address _____

_____

Please return to Back Issues, PCW, 12-13 Little Newport Street, London WC2R 3LD.

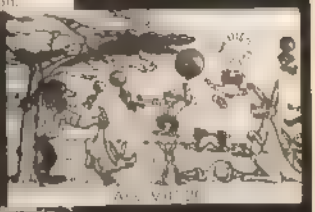
# PARAMOUNT SOFTWARE

A Registered Trading Name of Workstation (UK) Ltd

**CHOCABLOC** – A fast moving, pure Machine Code action game, with Chocablocs, our hero trying to sort out some Real Cool Choc Bits until everything goes crazy and the action is on! Arcade standard. Joystick required. Excellent sound and graphics. Keyboard or joystick.

VIC 20 16K + expansion.

£6.50



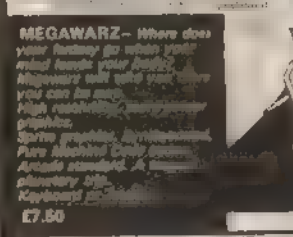
**OUTBACK** – Can you use that very special defence you've got to beat off the pioneering Snaggletooth? How fast will your reactions be? Pure Machine Code action. Fully featured. Superb sound and graphics. Arcade standard. A game with a difference. Joystick.

£5.50

**COUNTDOWN** – Time is important. Accuracy essential. Courage mandatory. But above all, Nerve is the prime attribute needed for your mission at an agent in the great S.M.U.G. A Superb Arcade/Graphics Adventure.

Keyboard

£5.50



**MEGAWARZ** – Where does your fantasy go when your mind leaves your body? Megawarz will take your mind where you can be only... High resolution, multi-coloured graphics. Sprites. Pure Machine Code. Arcade standard. A planetary blitz. Keyboard

£7.50

**CASTLE OF DOOM** – Fully implemented graphic adventure. A compelling and devious plot which retains excitement and interest to the end – if you ever reach the end! An experience to astonish, not to be missed. It's your friendly vic !

£5.50

**JOGGER** – Truly a joggist attempt! Jogger, if you get tired with the cars, may be the best. Machine Code Action. Spectacular sound. Colourful graphics. A quality game from Paramount. Joystick.

Any VIC 20.

TRADE ENQUIRIES Tel: (0642) 604470

**WRITING MARKETABLE PROGRAMMES?** Hitch your wagon to PARAMOUNT. Send for evaluation and terms.

**Paramount Software, 67 Bishopton Lane, Stockton, Cleveland, TS18 1PU. (England)**

| | | | |
|---|---|---|---|
| Chocabloc | £6.50 | ☐ | Name..... |
| Outback | £5.50 | ☐ | Address..... |
| Countdown | £5.50 | ☐ | ..... |
| Jogger | £5.50 | ☐ | ..... |
| Castle of Doom | £6.50 | ☐ | ..... |
| Megawarz | £7.50 | ☐ | ..... |

I enclose cash/cheque/P.O. for £.....

Overseas orders add £1.00 for airmail.

# The legend continues

***Graham Taylor** looks at the men behind* Valhalla *– a Norse legend brought to life*

To date, Legend Software has released one game — a game that, depending on which chart you believe, has occupied one of the top five positions since the day of its release and looks set to remain there all Christmas and beyond. The game is *Valhalla*.

For a game which is doing so well, surprisingly little has been heard about the company. But, romantics who like stories of 12-year-old whizz kids are going to be disappointed. *Valhalla* is the end result of nearly nine months of coding by a team of seven, the majority of whom are very experienced programmers.

The almost military operation was masterminded by managing director John Peel. "The idea that we should do an animated graphics adventure goes back nearly two years. It really is the first logical step on the way to an interactive movie — something indistinguishable from a real film, except that you are one of the characters.

"The idea of interactive movies is pretty dramatic. We wanted a name for the company that would imply something romantic and grandiose — the name Legend was no accident, we spent days ploughing through dictionaries."

*Valhalla* has graphics and characters loosely based on Norse myth. Backgrounds depict forests, castles, caves and lakes and the characters are dressed with helmets and armour — as is appropriate to the theme.

In fact, though, such details were not decided until a very late stage of development: "They are incidentals really. We had outlined several different plots and *Valhalla* happened to be first. Once the Movisoft operating system was functional, aspects like shapes of character and types of background were mere detail."

It's Movisoft that ensures that *Valhalla* will be no one off. "Timing for *Val II* is less a matter of coding and more a question of market timing. Once demand for *Valhalla* has calmed down a bit and is licking over we'll issue it — I think we're looking at next spring."

Needless to say, *Val II* will not be called *Val II* but John would give away few details about it. "It won't be staggeringly different, but it will definitely be an improvement — we've learnt a lot from *Valhalla*."

John Peel has been involved in computer software for quite a while. He started Premier Publications, which later became Premier Microsystems — now familiar for a Dragon disc drive. He sold that company to set up another one familiar to Spectrum owners, Micrel.

"Micrel was an idea waiting for a computer. When the Spectrum was announced we were ready — the first product, *Use and Learn*, came out within days of the computer."

Micrel was successful in an unspectacular way, and became the means of financing *Valhalla*. "The cost of *Valhalla* was at least £70,000 with all the development work and other outgoings. We were committed to selling a lot of programs to break even."

VALHALLA

The company has already recouped its costs and more. "I'm afraid we have bought the obligatory black Turbo Porsche, but the rest will be ploughed back into other projects."

Legend will be licencing Movisoft to other companies. The hope is that it will become the adventure game equivalent of CP/M — so standard that many computer manufacturers will allow for its easy implementation on their new machines.

"What's important is the size of memory — 48K is more or less mandatory — but I don't anticipate many new machines having less than that.

"Movisoft is not really specific to the Spectrum's Z80 processor at all. We did it on that machine simply because we could and it has sold the most," adds John.

This is borne out by the fact that *Valhalla* will be issued on the Commodore 64 in February: "The Commodore 64 version of the game will be similar to the Spectrum one, but obviously the graphics will be better. For one thing, the characters will be more than one colour and we should also be able to do more with the backgrounds."

The team responsible for *Valhalla* was Graham Asher, Richard Edwards, Charles Goodwin, James Learmont, Jan Ostler and John. Several of the team were ex-IBM employees. None of the team had ever played a computer adventure before starting on the project, although some were *Dungeons and Dragons* fans.

Managing director John Peel

Jan Ostler was responsible for many of the overall themes and ideas and, particularly, the characterisation. "The first thing I did when work began in earnest was to buy every adventure game I could lay my hands on — I spent a fortune.

"I was amazed at the lack of professionalism — most of them were full of spelling mistakes and obvious bugs — the only exception was *The Hobbit*."

John agreed: "I was sufficiently impressed to have a technical analysis done on it — the gist of that was 'well yes, but we can do better'.

"If we have done better, I think it's down to working as a team, giving people different and separate responsibilities. It's really impossible to do a big project like this any other way — take the analogy with conventional movies, imagine one person being not only the cameraman and the director but also having to design his own camera."

The success of that design can be seen in the number of technical achievements in *Valhalla*. Two aspects are particularly interesting — the seeming independance of the characters and their ability to continue with what they are doing, not only as you watch, but even when you are typing in commands.

VALHALLA

The character independence was achieved by a technique known in artificial intelligence circles as "fuzzy logic". This involves a deliberate smearing of fixed patterns, using random processes. Put simply, instead of saying "under condition *X*, Character *Y* will do *Z*", the situation is changed so that *Y* might not do *Z* under condition *X* although the character probably will.

"Actually it's nothing like as simple as sticking a random number from time to time. Rather, there are multiple levels of generators controlling the events, some are predictable, others are not — we control how they interact."

The way action and input can occur at the same time — a technique known as concurrency — is less easy to explain.

Apparently, "the concurrency is achieved by using vectored interrupts in conjunction with registers and stack 'lookaside' copies," said John. Now you know.

In keeping with its name, Legend's plans for the future are dramatic and grandiose. "We're waiting for the hardware to a certain extent, to get the kind of graphics we want to do, we need a lot more memory.

"We're also interested in the idea of speech. Quite honestly, the only thing stopping anyone from having a speech unit with decent human-like speech is that no one has got round to designing a new chip — everyone is still using the Texas chip, that's why they all sound like Daleks."

Another area that interests Legend is speech recognition. "It's not that difficult to get a computer to recognise speech, but it's difficult to do it under normal conditions, ie, when everyone shouts at once."

Assuming these problems are solved, John is very enthusiastic about the outcome. "With plenty of memory, plus good speech, plus speech recognition, there is no reason why there should not be a program visually indistinguishable from a tv picture with characters whom you can speak to and who will answer back — the potential market is enormous."

John actually sees a day in which there will be something like a video library, with all sorts of different interactive movies on all sorts of themes which people hire for

the evening. "You could have just as many themes as normal videos — cowboys, horror, science fiction and so on.

"A whole new kind of artistic talent might develop — if we can make Movisoft simple enough to operate so that only a small amount of actual programming knowledge is necessary, then creative people could use the system to design plots and characters like a scriptwriter or a director."

So far as the future is concerned John doubts that many of the micros being launched now will survive. "There are some nice machines, but quite honestly I don't see how they are going to survive — in this country Sinclair and Commodore have got it sewn up — or at least they have if they choose to play rough. I don't think we'll see more than three or four manufacturers survive in the next few years — then we'll see the kind of standardisation under which systems like Movisoft can flourish."

Some of the lessons learnt from *Valhalla* will bear fruit in non-adventuring areas, says Jan. "There is no sensible reason why computers should be the province of males between 15 and 35, but people just haven't discovered how to write programs for women. We have something planned that will help to change that situation."

Legend are giving little away, but it seems such a project would involve some of the artificial intelligence techniques used in *Valhalla* to an even more sophisticated degree.

Legend seems a peculiar mixture of daydreamers, who've proved their dreams are at least partly possible, and fairly hard-bitten realists playing close attention to the market and its requirements. It may be that this mixture was a vital part of the success of the project.

John Peel sums up *Valhalla* in the following way: "I would call it a qualified success — certainly we've proved that a number of things are possible on a cheap home computer that everybody said were impossible. More than that, I think we've introduced the basic concept to people. Naturally there are a lot of things I would change about *Valhalla*, things which could have been done better even on a Spectrum — wait until the next one." ■


ULTRASOFT

BETTER SOFTWARE AT BETTER PRICES

PO BOX 167, UXBRIDGE, MIDDLESEX UB10 0RG

**COMMODORE 64**

**AMOK** Scramble, Hexpert, Moon Buggy Frogrun. RRP £7.95 **Our Price £5.95. INTERCEPTOR** Siren City Token of Gaul Frogger Crazy Kong RRP £7.00 **Our Price £5.00 QUICKSILVA** Purple Turtles, Aquaplane RRP £7.95 **Our Price £5.95. LLAMASOFT** Hovver Bovver, Mutant Camels. RRP £7.50 **Our Price £5.50. ARCADIA 64** now available **THE HOBBIT** now available

**VIC20**

**LLAMASOFT** Megagalactic Llama's. RRP £6.00 **Our Price £5.50. ULTIMATE** Jet Pac. RRP £5.50 **Our Price £4.95**

**DRAGON**

**MICRODEAL New releases** Space Fighter Dragon Hawk Devil Assault Scramble Pin ball Gladiators Eightball Frogger and all other titles RRP £8.00 **Our Price £7.75. Imagine, Leggit now available**

**SPECTRUM**

**ULTIMATE** Abc Atak Lunar Jetman RRP £5.50 **Our Price £4.94 OCEAN** Mr Wimpey Armageddon Kong RRP £5.90 **Our Price £3.95 CRYSTAL** Bodysnatchers Rommels Revenge RRP £7.50 **Our Price £6.50. VALHALLA** RRP £14.95 **Our Price £13.95 STONKERS, ALCHEMIST** now ...

SEND CHEQUE OR POs. OR SEND 12"2p STAMP FOR OUR NEW 12-PAGE CATALOGUE. OUT NOW! FREE CATALOGUE SENT WITH EVERY ORDER



SUNSHINE

**Publishers of Popular Computing Weekly, Dragon User, Commodore Horizons and Micro Adventurer**

**AUTHORS**

Sunshine already publishes a highly acclaimed and best selling list of computer books.

But we are always looking for new ideas and new authors.

If you have an idea and think you could write a good book why not write to us and find out what we can offer?

**David Lawrence, Book Editor, Sunshine, 12/13 Little Newport Street, London WC2R 3LD**



**SOPHISTICATED GAMES FOR VIC20**

VIC CRICKET. Realistic game of skill and luck with all the major rules of cricket correctly interpreted. Full scorecard, printer and game save facilities. Needs 16K expansion £5.99.*

LEAGUE SOCCER. League championship game for two to 22 teams players. Automatic fixtures. Full action commentaries, match facts, League tables, results check postponed games, etc. Non league matches also playable — the VIC will even make the cup draw. Printer and game save. Needs 16K expansion. £5.99.*

WHODUNNIT? Twelve guests have gathered for drinks at Murder Manor. However one of them has more than drinks on his mind. Thrilling detective game for one to six players with genuinely different murder every time. You can even rename the suspects! Needs 8K expansion. £4.99.*

TOP OF THE POPS. Money making game about the music business. Make your own records and see them climb the chart. Printer and game save facilities. Needs 8K expansion. £4.99.*

VIC PARTY 4. Contains MASTERWORD, A DAY AT THE RACES, GAME X (Strip Poker), and CONSEQUENCES. Four games ranging from the serious to the ridiculous. All good fun — nothing offensive. Needs at least 3K expansion. £5.99.*

Available from

**SOPHISTICATED GAMES, Dept. PCW, 27 Queens Road, Keynsham, Avon BS18 2NQ. Tel: 02756-3427.**

WRITE FOR DETAILS OF OUR FULL RANGE.

*P&P free (U.K.) only. All games sold subject to our conditions of sale, which are available on request.



**TWO GREAT NEW GAMES**
**FOR THE 16/48K SPECTRUM**

**AMPERA FOR THE ARCADE ENTHUSIAST**

The Amperas, aliens from another world, have invaded and are trying to drain the city's power. As the gridrunner, your job is to link the power lines to light up the city. But beware, the Amperas are highly charged and can kill!!!

Ten levels. Demo mode (48K only) ..... **£5.90 each**

(Keyboard or Joystick)

**SPECTRAL REPEAT FOR THE WHOLE FAMILY**

A mind teaser, based on the proven game Simon, but faster and increases in speed, taxing your wits to the full. Your score/high score facility **£4.90 each**

*TRADE ENQUIRIES WELCOME*

**PLAZASTAR LTD.**
**SEYWARD HOUSE, ABINGDON ROAD**
**NUFFIELD TRADING ESTATE, POOLE, DORSET**

# In the driving seat

***Graham Taylor** looks at three games designers and compares the results*

Does the following pattern sound familiar? You buy a computer after months of planning and saving. For a while you play with it avidly, you even learn a reasonable amount of Basic programming. There follows a period of increasing disenchantment as you realise that your own programs are never likely to reach the standards of the top software houses — gradually your computer gets left on the shelf more and more, a sad, lonely sight.

What we all hope to get from having a computer is a kind of technological Lego — an endlessly changeable toy. The problem is that just buying commercial programs doesn't bring the satisfaction of creating them yourself.

If this does sound familiar, then now is the time to bring out your machine from the top shelf and dust it down. The fun may come back to computing — the games designers have arrived.

These packages allow you to create your own games, using various kinds of menus or special languages. The result is a far more professional game that is faster than anything written in Basic. The price you pay is some degree of restriction in the kinds of game you can create.

Although the packages reviewed here are predominantly Spectrum-based, you can expect to see similar programs being made available for other machines shortly.

To begin with though, *CoCo II*, a program for the Vic20 that's been around for quite a while, but hasn't been distributed widely in this country.

You design your game in two distinct sections — *Player* and *Opponent*. Within each section you use a simple, Basic-like, language to determine the pattern of movement and the score values. Movement is by a minimum of four pixels at a time, which means that the end result is bound to be fairly jerky.

The language is easy to use: the eight points of the compass are assigned numbers, with one extra number for 'track', ie, for the opponent and player to follow one another. Movement is then a matter of a series of commands like *Move 1 5, Move 4, 12* etc meaning *SW* for 5, 4 pixel units, then *W* for 12 units.

Shapes are designed using a simple user-defined graphics generator, operated by joystick — you just fire to turn a pixel on or off. The program comes with an extensive manual and one sample game which, unfortunately, doesn't really show the program off at its best.

The problem with *CoCo II* is that the end results are rather disappointing — they are not really very much better than you could do with only a limited knowledge of Basic — the only exception to this being the ease with which you can create shapes, but then there are plenty of programs around to help you do that for far less money.

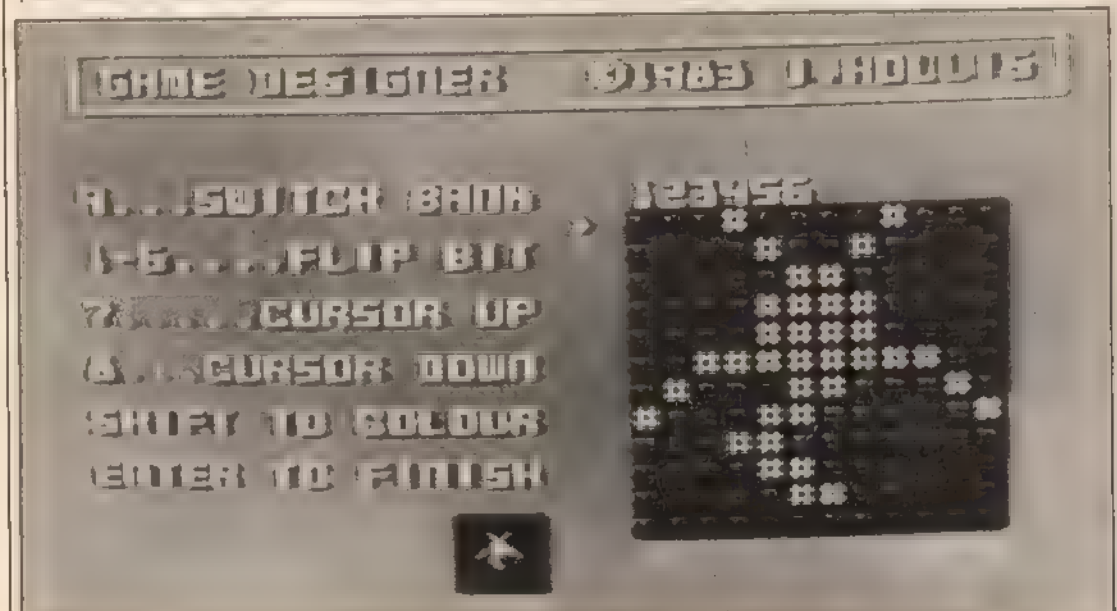
In terms of the quality of the end result, *Games Designer* from Quicksilva is a far more impressive package. The program comes with eight ready-made games, any of which might have been marketed successfully in its own right in the early days of Spectrum games.

The main reason for the quality of the games is the provision of a sprite generator within the program — independent graphic shapes whose movements can be individually defined. Sprite movement is smooth and fast and is the basis for most arcade machines. Using simple cursor controls any shape may be assigned, up to 32 sprites, as may any colour.

Any of four game formats can be selected — *Invaders*, *Defender*, *Asteroids* or *Beserk* type. The difference between the game lies in the screen layout and the position and manoeuvrability of the missile base/spaceship; eg, *Invaders* format gives you a base at the bottom of the screen, with waves of aliens attacking from the top, and base movement limited to left and right. In *Asteroids* format, the spaceship is placed centre screen with the enemy swirling around it — the base can move in all directions.

Using a series of menu options, sounds can be assigned to shapes using a simple but effective sound generator. The movement and attack waves are selected — ie, how many aliens move where and at what time. Movement is almost infinitely variable and is programmed in a similar way to *CoCo* with numbers assigned to directions. A line display shows you the pattern of movement you are creating.

Other options on the menu allow for a star background and optional features like whether or not your ship has a shield. You may also select which, if any, of your waves of attackers are able to fire back at you.



One of the most impressive features of the *Games Designer* is the animation of the aliens. By designing two appropriate sprites, a menu option allows you to switch quickly betwen them — thus, space invaders can wave their arms threateningly, or spheres can appear to spin.

If you like fairly straightforward alien bashing, then *Games Designer* is for you — you really can create games as good as those available commercially, but to your own specifications. The only criticism I would make ■ that you really don't have much choice over the basic structure ■ each game, since you must adopt one of the four predetermined formats.

As proof that the idea of programs for creating games aren't limited ■ arcade-style games, Gilsoft have now released *The Quill* — a program for constructing text adventures.

To use *The Quill* properly requires some effort and some experience — it is absolutely essential to go through the examples in the manual. But, although it requires the most effort ■ get a tangible result, *The Quill* is perhaps the most satisfying of ■ the programs mentioned.

The program again works by the use of menus. It is vital ■ plan out your adventure completely before you start — decide how many rooms there will be and where they will be in relation ■ one another; eg, bathroom west from bedroom, etc. You also need to decide what objects are located where and what conditions must be met to solve various obstacles, eg, the torch must be switched on before you go down to the cellar otherwise you fall and break your neck.

Using the menu, you enter the text associated with each room and the objects found there. The most difficult section ■ the list of acceptable verbs, this includes not only those vital to the plot, eg, '*Kill* vicious monster' but other inputs to which you want the game to respond wth something other than "I don't understand . . ."

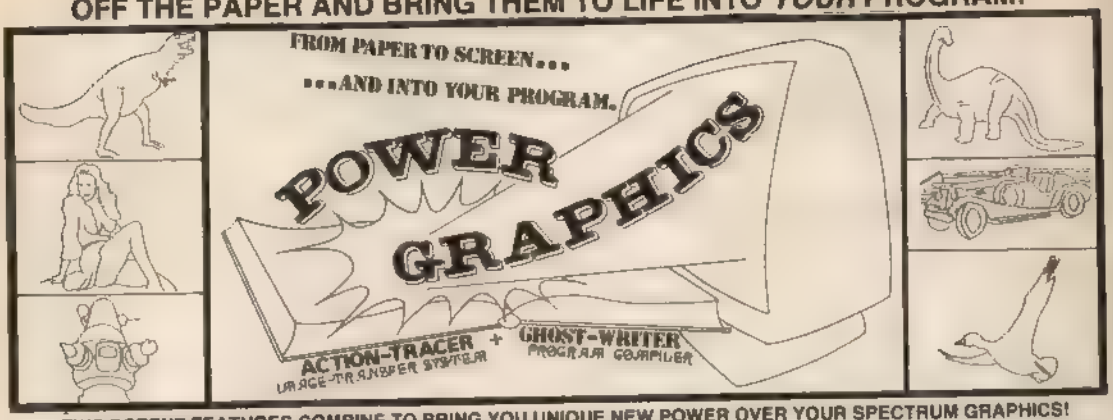
The crux of this input response is the use of flags — put simply these are ■ on/off switches used to determine various courses of action; eg, you may decide that flag 1■ is set on when someone picks up the screwdriver. Later on, opening a safe may depend on whether or not you have the screwdriver; ie, is the flag set or not? It's not difficult to use, but it does require logical thought, particularly if you want ■ create brain-teasing puzzles in the game.

For an adventure fan, possibly the only thing more satisfying than solving puzzles is creating your own and watching someone else trying to solve them — particularly when you can populate your adventure with people and places known to those likely to try and solve it. Gilsoft will even let you market your *Quill*-written adventure — they only ask for a mention. *Quill* supplies the programming (in machine code), all you have ■ provide is some thought, planning and perseverance.

Despite the odd reservation, all these packages can be recommended. They might breathe new life into your micro, merely by putting you back in the driving seat and letting you find out what you can do. ■

| Firm | Program | Cost |
|---|---|---|
| Gilsoft<br>30 Hawthorn Road<br>Barry<br>South Glamorgan CF6 8LE | *The Quill* | £14.95 |
| Games Designer<br>Software Studios<br>Quicksilva<br>13 Palmerston Road<br>Southampton<br>Hampshire | *Games Designer* | £14.95 |
| Mapsoft (Distributors)<br>Unit A Oak Road South<br>Hadleigh<br>Benfleet<br>Essex SS7 2BB | *CoCo 2* | £19.25 |

# NOW YOU CAN LIFT STATIC DRAWINGS, PHOTOGRAPHS, ETC RIGHT OFF THE PAPER AND BRING THEM TO LIFE INTO *YOUR* PROGRAM!

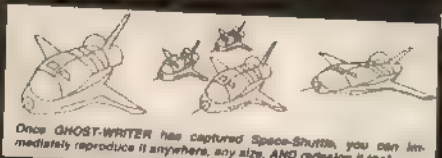



## TWO POTENT FEATURES COMBINE TO BRING YOU UNIQUE NEW POWER OVER YOUR SPECTRUM GRAPHICS!

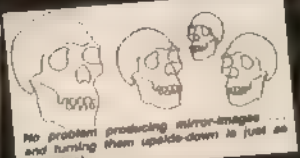
**● ACTION-TRACER** *Gives you the power to transfer drawings, photographs, paintings, lettering – in fact ANY paper-based images into full colour life drawings on your Spectrum screen, with astonishing ease and an accuracy that rivals expensive digital tracers. But this time you get more than just a static on-screen design that has to be laboriously stored on and off tape, because . . .*

**● GHOST-WRITER** *Interprets your on-screen design into the precise sequence of Basic instructions needed to EXACTLY reproduce it, and then writes the program for you, directly into memory! New program lines appear in your listing which are indistinguishable from ones you might have written yourself. When you've finished, POWER-GRAPHICS will 'self-destruct', leaving behind only your new program lines ready to use.*

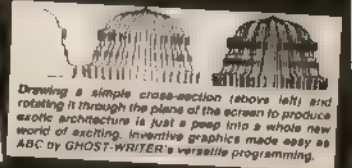
**● TOGETHER THEY'RE DYNAMIC!** *The new program captures your design DYNAMICALLY, giving you instantly the power to MOVE it anywhere, to SHRINK it down to a single pixel, or EXPAND it to fill the screen. You can SQUEEZE or STRETCH it into weird distortions, flip it UPSIDE DOWN or MIRROR-IMAGE it, ROTATE it in the plane of the screen . . . in other words MANIPULATE IT UNDER YOUR FULL CONTROL!*



*Once GHOST-WRITER has captured Space-Shuttle, you can immediately reproduce it anywhere, any size, AND redesign it too!*

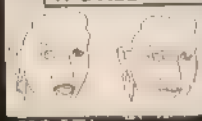


*No problem producing mirror-images . . . and turning them upside-down is just as easy, too!*



*Drawing a simple cross-section (above left) and rotating it through the plane of the screen to produce exotic architecture is just a peep into a whole new world of exciting, inventive graphics made easy as ABC by GHOST-WRITER's versatile programming.*

## ANIMATION OR MANIPULATION — IT'S ALL THE SAME TO POWER-GRAPHICS



Switching individual parts of a design is easy, and thanks to POWER-GRAPHICS' ability to produce high-speed curves, which DRAW as fast as straights, *even curved shapes can be animated in real-time* — like the lips of this well-known newsreader (recognise her?)

FUN TO USE, SIMPLE IN OPERATION, POWER-GRAPHICS IS AN IMPORTANT NEW TOOL FOR BEGINNERS AND ADVANCED USERS ALIKE, AND EXTENDS THE SPECTRUM'S POTENTIAL INTO EXCITING NEW REGIONS.

**NO EXTRA HARDWARE NEEDED! ALL YOU NEED IS . . .**

POWER GRAPHICS

**ZX SPECTRUM FOR 16K OR 48K ONLY £8.95**

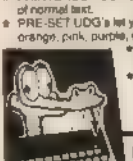
**IF YOU WANT PICTURES YOU CAN USE, IT HAS TO BE**

## SHEER MAGIC!

**THE POWER TO PRODUCE STUNNING TOP-QUALITY TEXT DISPLAYS FOR IMPRESSIVE PROGRAM OR VIDEO TITLES, OR ADVERTS, LETTERHEADS, ETC.**

**LOOK HOW EASY IT IS:**

- 4 movement-keys let you SET the 'Magic Window' to ANY rectangular shape and size, then MOVE it to any screen position.
- ANY LINE OF TEXT NOW ENTERED WILL BE PRINTED TO EXACTLY FILL THE SHAPE USING CURRENT COLOUR AND ATTRIBUTE SETTINGS.
- SETTINGS are always on display below the screen. Change and test-view your text in new colours etc. IN SECONDS!
- PAINTBRUSH CURSER will 'paint-in' detail effects, sketch with any character, or position lines of normal text.
- PRE-SET UDG's let you produce shimmer-effect borders, panels, etc. in new colours such as orange, pink, purple, etc., etc.
- LABEL command prints standard cassette label shape, ready for you to add text. Prints out true-to-scale on ZX printer.
- BANNER-WRITER MODE prints text sideways on ZX printer in the form of a huge banner, the height of each letter being full paper width.



**SPECTRUM TYPESETTER 16/48K £4.99**

**GRAFFIX** Character-control graphics made ultra-easy. Totally user-friendly. Continuous menus (series of multi-functions). Whatever you think you might want to do, this program does it in a keystroke! PRODUCES UDGs THAT SCREENS WILL RECOGNISE!! Sheer convenience for only **£3.99**

## SOUNDS FANTASTIC!

**Superb sound effects from your Spectrum have never been so easy!**

- YOU conjure up your own unique sound-designs on the graphic synthesizer control panel.
- AUTO-SONICS will instantly turn them into automatically compiled Basic program lines that will reproduce each sound again and again IN YOUR PROGRAM!
- 26 built-in effects include animals, engines, siren, phone, Monster growl, space sounds . . . etc. . . . etc. . . .

*Just the job . . . the effects are excellent" Personal Comp. World*

**SPECTRUM AUTO-SONICS**

**WINNER OF POW "WHIZZ-KID '82"**

". . . a very powerful program . . . the ease of use amazes me — it is so simple to alter and amend the sound . . . Well done BUTTERCRAFT — this is an excellent programming tool" (Educational Computing Dec. 82)

**16K or 48K £4.99**

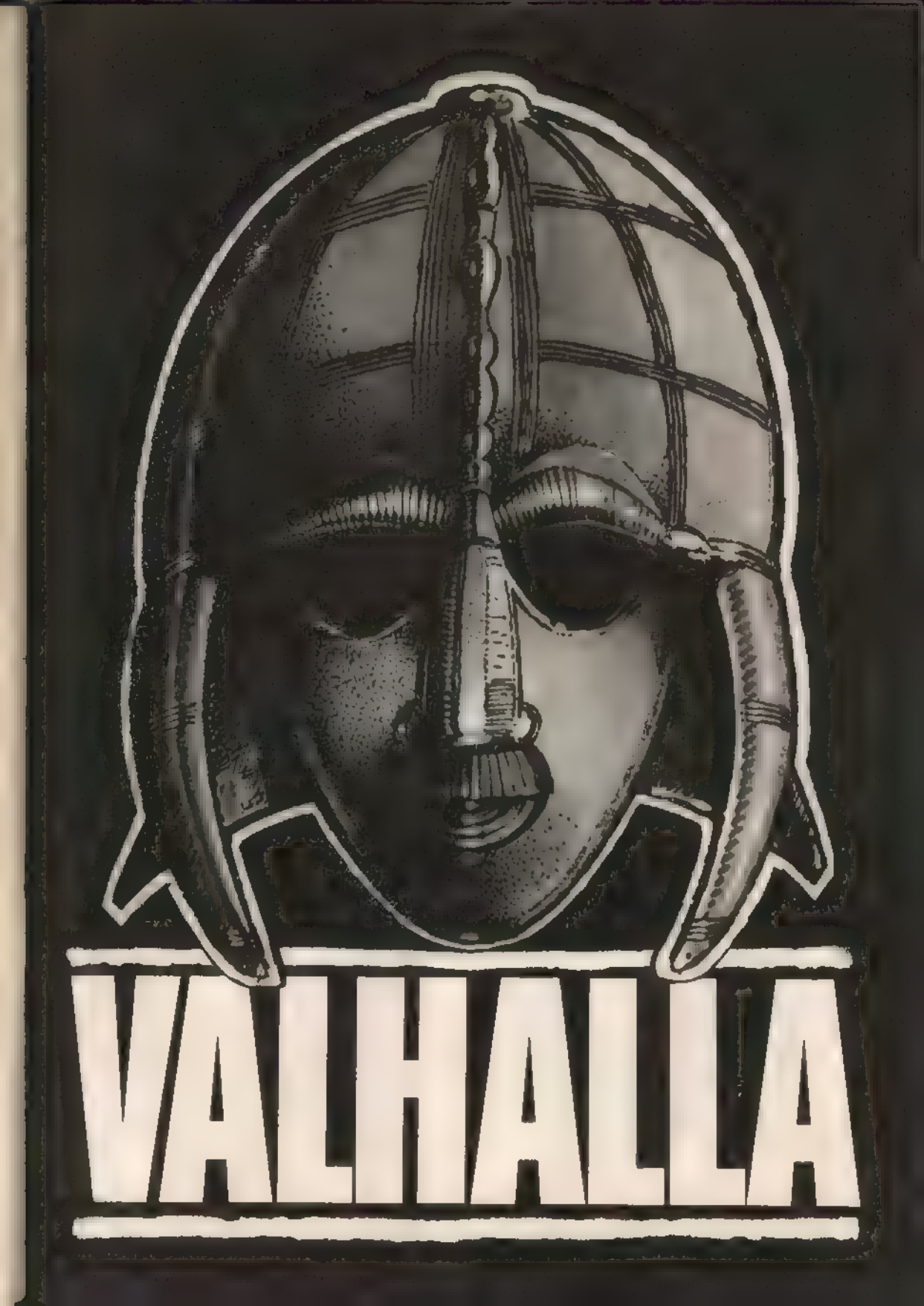
**CHRISTMAS RED ALERT!! GUARANTEED 1st CLASS SAME DAY DISPATCH!!**

**BUTTERCRAFT SOFTWARE**

**14 Western Avenue, Riddlesden, Keighley, Yorks. ENGLAND**

**OVERSEAS CUSTOMERS ADD £1.00 EXCESS POSTAGE**

**PLEASE DEDUCT 50p DISCOUNT ON 2nd AND SUBSEQUENT ITEMS ON YOUR ORDER**


VALHALLA

# One hundred and eighty

***Andy Wilson** concludes his series on structured programming for the ZX81*

Last week we looked at assembly language. I now hope to give a few more tips on using the routines.

As the procedures must be defined before they are called it ■ best to have ■ the procedure definitions ■ the beginning of the program. Alternatively, you could throw your scruples to the wind and use a *Gosub*, with the definitions at the end of the program.

Procedures can be called from within other procedures, or even iteratively; ie, a procedure can call itself, but keep one eye on the procedure stack!

One of the shortcomings of the routines is that parameters cannot be passed to and from procedures. We can, however, simulate this facility in the same way we might when using *Gosubs*, eg:

```
500 LET X = Y
510 LET XFACTORIAL = USR CALLPROC
520 LET Y = X
```

With an appropriate procedure *XFactorial* this will work out the factorial of *Y*, or any other variable we may wish to use.

Listing 7 is an example of a full program written using the routines. It is supposed to simulate the electronic darts scoreboards often seen in pubs. It has the advantage that the score of each dart can be entered individually, with a constant display of the running scores, and the current thrower's round score and score needed to finish.

You will, I hope, notice the total absence of the dreaded *Gotos* and *Gosubs*. You will also, in all probability, notice the lack of the explanatory REMs whose virtues I extolled earlier. This is a deliberate move intended to show how easy it can be to follow the gist of a reasonably structured program.

Although I have not used REMs to actually explain the program, I have used them to help clarify the structure. REMs followed by a line or more of spaces are used to separate parts of the program, while REMs followed by graphic shifted 7s are used to underline procedure names.

The program was written 'top down'; that is the outline of what procedures would be needed, and how they would relate to each other, was decided before any actual code was written. Naturally this outline has often changed by the time a program is complete, but this method still helps make it easier to understand. You should get a rough idea of how the program works simply by looking at the procedure names and where they are called.

Nevertheless, I expect some explanation of the program would not go amiss. If you intend to type in the program I suggest you do so first, after *Loading* the machine code of course, then *Run* it. This should make things much clearer.

I will give a brief explanation of each procedure, in reverse order, starting with:

*Intro:* I hope you can guess what this does. Called by the main program.

*Scrollup:* as the name suggests scrolls the screen up one line, keeping the current print line the same. The top line, T$, is reprinted so we don't lose it. Note the *Print* after *Scroll* to avoid upsetting the display. Called by *Play*.

*DartIn:* checks the score entered is, in fact, a possible dart throw, and sees if it is a double or treble. Called by *ScoreIn*.

*ScoreIn:* inputs the score and converts it from a string to an integer. Called by *Round*.

*Round:* gives a player three throws, adds each dart to the round score and takes it away from the score needed to win. It then makes sure the player hasn't 'bust'. Called by *Play*.

*Play:* firstly looks at the print line to see if the screen needs scrolling. It then plays a *Round* for each player. If the player hasn't bust it updates the score and prints the new one. Called by the main program.

*Win:* if a player's running score is 0 and his/her last dart was a double or a bull we call *Win*. A polite message is printed, a note is taken of who won, I is set to 2 in order to leave the *For* loop, and the *Won* flag is set. Called by *Round*.

*Main Program:* starts by calling the *Introduction* and setting up two strings for the headings and spaces. The rest of the program is repeated until the reply to the "*Play Again?*" prompt is not'*Y*". After initialising the variables and the screen we keep *Playing* until the *Won* flag is set.

Presuming you know how to play darts that should have been quite easy to follow. I hope you have found these articles interesting and maybe even useful. If you were looking for tips on saving memory or speeding up your games you have read the wrong articles, but if you've got this far you must have got something from them, and any comments or even criticisms, constructive of course, would be very welcome. ■

LISTING 7

EXAMPLE PROGRAM

```
  10 REM **DARTS SCOREBOARD**
     ========================


  20 LET PLAY=USR DEFPROC
  25 REM
  30 LET LINE=LINE+1
  40 IF LINE=18 THEN LET SCROLLU
P=USR CALLPROC
  50 FOR I=1 TO 2
  60 LET ROUND=USR CALLPROC
  70 LET S(I)=S(I)-(ROUNDSCORE A
ND NOT BUST)
  80 PRINT AT LINE,I*10;S(I)
  90 NEXT I
 100 RAND USR ENDPROC
 110 REM

 200 LET ROUND=USR DEFPROC
 205 REM
 210 LET ROUNDSCORE=0
 220 PRINT AT 19,0;"PLAYER ";I;"
>"
 230 LET BUST=0
 240 LET DARTS=0
 250 RAND USR REPEAT
 255 PRINT AT 20,0;"YOU NEED ";T
AB 4;S(I)-ROUNDSCORE;" "
 260 LET DARTS=DARTS+1
 270 LET SCOREIN=USR CALLPROC
 280 PRINT AT 19,DARTS*4+8;D$
 290 LET ROUNDSCORE=ROUNDSCORE+D
ARTSCORE
 300 IF S(I)-ROUNDSCORE<2 THEN L
ET BUST=1
 310 IF S(I)-ROUNDSCORE=0 AND (M
ULT=2 OR DARTSCORE=50) THEN LET
WIN=USR CALLPROC
 320 PRINT AT 19,25;(STR$ ROUNDS
CORE) AND NOT BUST;"BUST" AND BU
ST AND NOT WON
 330 POKE UNTIL,DARTS=3 OR BUST
 340 RAND USR CHECK
 350 FOR F=1 TO 30
 360 NEXT F
 370 PRINT AT 19,0;S$;TAB 0;S$;T
AB 0;S$
 380 RAND USR ENDPROC
 390 REM

 400 LET SCOREIN=USR DEFPROC
 405 REM
 410 RAND USR ALPHA
 420 LET ERROR=0
 430 INPUT D$
 440 LET DARTIN=USR CALLPROC
 450 POKE UNTIL,NOT ERROR
 460 RAND USR CHECK
 470 LET DARTSCORE=VAL D$*MULT
 480 LET D$=D$+D$
 490 RAND USR ENDPROC
 495 REM

 500 LET DARTIN=USR DEFPROC
 505 REM
```

```
  510 IF D$="" THEN LET D$="999"
  520 LET MULT=1+(D$(1)="D")+2*(D
$(1)="T")
  530 LET D$=D$(1) AND MULT>1
  540 IF MULT>1 THEN LET D$=D$(2
TO)
  550 FOR F=1 TO LEN D$
  560 IF D$(F)<"0" OR D$(F)>"9" T
HEN LET ERROR=1
  570 NEXT F
  580 IF NOT ERROR THEN IF (VAL D
$>20 AND VAL D$<>25 AND VAL D$<>
50) OR (VAL D$>20 AND MULT>1) TH
EN LET ERROR=1
  590 RAND USR ENDPROC
  595 REM

  600 LET WIN=USR DEFPROC
  605 REM
  610 PRINT AT 19,25;"YOU WON"
  620 LET WINNER=1
  630 LET I=2
  640 LET WON=1
  650 RAND USR ENDPROC
  660 REM

  700 LET SCROLLUP=USR DEFPROC
  705 REM
  710 SCROLL
  720 PRINT TAB 31;" "
  730 LET LINE=17
  740 PRINT AT 0,0;T$
  750 RAND USR ENDPROC
  760 REM

  800 LET INTRO=USR DEFPROC
  805 REM
  810 PRINT TAB 8;"DARTS SCOREBOA
RD";TAB 8;"==============="
  820 PRINT AT 5,0;"SCORES SHOULD
 BE ENTERED IN THE FORM SHOWN BE
LOW.   E.G.:-"
  830 PRINT AT 9,0;"SINGLE 7","=
S7","DOUBLE 18","= D18","TRIPLE
20","= T20","OUTER BULL","= 25",
"BULSEYE","= 50"
  840 PRINT AT 15,10;"PRESS ■ KEY
"
  850 PAUSE 4E4
  860 RAND USR ENDPROC
  870 REM
 1000 REM *MAIN PROG STARTS HERE*
      ==========================
 1005 LET INTRO=USR CALLPROC
 1010 DIM S(2)
 1020 LET S$="
                "
 1030 LET T$="          PLAYER 1  P
LAYER 2"
 1040 RAND USR REPEAT
 1050 CLS
 1060 LET S(1)=501
 1070 LET S(2)=501
 1080 LET WON=0
 1090 LET LINE=1
 1100 PRINT AT 0,0;T$
 1110 PRINT AT 1,10;S(1);TAB 20;S
(2)
 1120 RAND USR REPEAT
 1130 LET PLAY=USR CALLPROC
 1140 POKE UNTIL,WON
 1150 RAND USR CHECK
 1160 PRINT AT LINE,WINNER*10;"WO
N"
 1170 PRINT AT 21,0;"PLAY AGAIN ?
 (Y/N)"
 1180 INPUT U$
 1190 PRINT AT 21,0;S$
 1200 POKE UNTIL,U$<>"Y"
 1210 RAND USR CHECK
 1250 STOP
 1260 REM

 9997 REM **AUTO-RUN**
      ============
 9998 SAVE "DART■"
 9999 RUN
```


# PROGRAMMING AIDS AND LANGUAGES FROM .... Audiogenic Ltd

## FOR COMMODORE VIC-20 AND 64!

**VP052 BUTI PLUS - £39.95** - Basic Programming Aid Commands PLUS Machine Code Monitor PLUS 3K Expansion! Basic aids include APPEND, AUTO, DELETE, DUMP, EDIT, FIND, HELP, RENUMBER REPEAT, STEP, TRACE, UNNEW, VIC, and DEC to HEX Monitor Commands - ASSEMBLE, DISASSEMBLE, CENTRONICS, FILL, GO, MEMORY, HUNT, REGISTER, PRINTED DISASSEMBLE, LOAD, QUICK EXECUTE, WALK CODE, SAVE, TRANSFER, EXIT

**VP074 MONITOR VIC - £19.95** - Monitor on its own. Commands as above

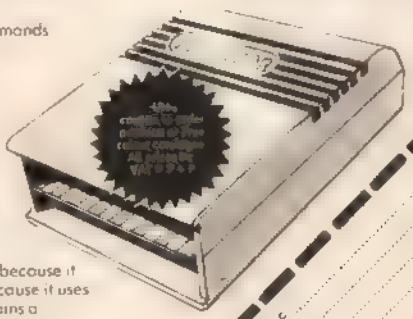
**VP074 MONITOR 64 - £29.95** - 64 version. Commands as above

**VP078 MIKRO ASSEMBLER - £48.95** - Cartridge Assembler program for the VIC - Includes 3K extra memory. Write your machine language source code on Basic Lines which can be manipulated using the included toolkit commands. MIKRO uses standard MOS mnemonics, and features ASSEMBLER and DISASSEMBLER, plus TIM monitor commands, and special hi-res, sound, and joystick extensions.

**VP076 FORTH 64 - £39.95** - Audiogenic Forth is very fast because it compiles right down to machine code, and very compact because it uses special screen compression routines. Audiogenic Forth contains a dictionary of over 200 Forth words, but the great thing about Forth is that you can define your own commands! Audiogenic Forth gives you full error messages (instead of codes), a full scrolling screen editor, and a comprehensive manual.

**VP076 FORTH VIC - £24.95** - As above, but includes special VIC colour and sound commands. This version must be used in a motherboard with 8K+ expansion

**VP076/M FORTH VIC (with memory) - £39.95** - As VP076, but includes 3K expansion built-in so that you don't need a motherboard and expansion.



(PRODUCT & CODE NO.)

PLEASE SEND ME .....

NAME .....

ADDRESS .....

AUDIOGENIC LTD., P.O. BOX 88, READING, BERKS.

# One page at a time

***Richard Walton** presents a modified print routine for listing programs*

The Dragon *List* routine is inconvenient if a long program is to be edited. Although *Shift @* can be used to stop the listing ■ any time, an automatic "paging" of the listing is much more convenient.

The accompanying program provides such ■ facility. It does this by intercepting the Dragon's normal routine.

An assembler listing is provided to show how the routine works. In addition, a Basic program ■ given for users who do not have an assembler.

The program uses a number of useful addresses as follows:

*H16A* or *362*: this is called by Basic whenever a key is pressed. The program intercepts this call. Normally this address contains a 57 code (*Rts*) but the program replaces this with a 126 code (*Jmp*).

*H167* or *359*: this is called whenever a character is printed. This is intercepted in the way described previously.

The Rom routine to get a character from the keyboard is also used. This is ■ address *41194*.

When the Basic program ■ Run, the machine code is *Poked* into reserved memory from address *32001*. The program contains a check on the Data statements and will stop if an error is found. The *Pokes* in lines 710 to 730 set up the interrupts which call the program.

The program can be called by pressing down-arrow key when required. A further pressing of the key returns to normal Basic print routine, which makes the running of programs more convenient.

When first entering and testing the program listing, leave out line 770 or you won't be able to alter it. ■

```
100 'IMPROVED DRAGON LISTING
110 'ROUTINE - R.WALTON.
120 '19/11/83
130 CLEAR 200,32000
140 FOR I=32001 TO 32008
150 READ A$:A$="&H"+A$
160 A=VAL(A$):POKE I,A
170 T=T+A
180 NEXT I
190 IF T<>439 THEN PRINT"DATA
    ERROR IN 620":STOP ELSE T=0
200 FOR I=32009 TO 32016
210 READ A$:A$="&H"+A$
220 A=VAL(A$):POKE I,A
230 T=T+A
240 NEXT I
250 IF T<>442 THEN PRINT"DATA
    ERROR IN 630":STOP ELSE T=0
260 FOR I=32017 TO 32024
270 READ A$:A$="&H"+A$
280 A=VAL(A$):POKE I,A
290 T=T+A
300 NEXT I
310 IF T<>789 THEN PRINT"DATA
    ERROR IN 640":STOP ELSE T=0
320 FOR I=32025 TO 32032
330 READ A$:A$="&H"+A$
340 A=VAL(A$):POKE I,A
350 T=T+A
360 NEXT I
370 IF T<>622 THEN PRINT"DATA
    ERROR IN 650":STOP ELSE T=0
380 FOR I=32033 TO 32040
390 READ A$:A$="&H"+A$
400 A=VAL(A$):POKE I,A
410 T=T+A
420 NEXT I
430 IF T<>521 THEN PRINT"DATA
    ERROR IN 660":STOP ELSE T=0
440 FOR I=32041 TO 32048
450 READ A$:A$="&H"+A$
460 A=VAL(A$):POKE I,A
470 T=T+A
480 NEXT I
490 IF T<>771 THEN PRINT"DATA
    ERROR IN 670":STOP ELSE T=0
500 FOR I=32049 TO 32056
510 READ A$:A$="&H"+A$
520 A=VAL(A$):POKE I,A
530 T=T+A
540 NEXT I
550 IF T<>965 THEN PRINT"DATA
    ERROR IN 680":STOP ELSE T=0
560 FOR I=32057 TO 32064
570 READ A$:A$="&H"+A$
580 A=VAL(A$):POKE I,A
590 T=T+A
600 NEXT I
610 IF T<>853 THEN PRINT"DATA
    ERROR IN 690 OR 700":STOP
620 DATA 20,01,12,B1,0A,26,1D,B6
630 DATA 7D,03,81,01,26,0C,86,00
640 DATA B7,7D,03,86,39,B7,01,67
650 DATA 20,0A,86,01,B7,7D,03,86
660 DATA 7E,B7,01,67,39,20,01,12
670 DATA 34,06,B6,7D,28,81,C8,25
680 DATA 0B,7F,7D,28,4F,BD,A0,EA
690 DATA B1,20,26,F9,35,06,7C,7D
700 DATA 28,39
710 POKE 360,&H7D:POKE 361,&H26
720 POKE 363,&H7D:POKE 364,&H01
730 POKE 359,126:POKE 362,126
740 CLS:PRINT:PRINT"
    PROGRAM INSTALLED"
750 PRINT:PRINT"  PRESSING
    <DOWN-ARROW> TOGGLES"
760 PRINT"  PROGRAM ON AND OFF"
770 NEW
```

```
7D01
7D01 2001
7D03 12
7D04 810A
7D06 261D
7D08 B67D03
7D0B 8101
7D0D 260C
7D0F 8600
7D11 B77D03
7D14 8639
7D16 B70167
7D19 200A
7D1B 8601
7D1D B77D03
7D20 867E
7D22 B70167
7D25 39
7D26 2001
7D28 12
7D29 3406
7D2B B67D28
7D2E 81CB
7D30 250B
7D32 7F7D28
7D35 4F
7D36 BDA0EA
7D39 8120
7D3B 26F9
7D3D 3506
7D3F 7C7D28
7D42 39
7D43
```

```
30      PRT $000C
40      BRA @START
50 @TOGGLE NOP
60 @START CMPA #10 DOWN ARROW
70      BNE @OUT IF NOT THEN RETURN
80      LDA @TOGGLE
90      CMPA #1 IS ROUTINE ON
100     BNE @SETLIST IF NOT PUT ON
110     LDA #0
120     STA @TOGGLE SET OFF FLAG
130     LDA #57
140     STA 359
150     BRA @OUT
160 @SETLIST LDA #1
170     STA @TOGGLE SET ON FLAG
180     LDA #126 JUMP TO NEW ROUTINE
190     STA 359
200 @OUT RTS
210     BRA @START1
220 @STORE NOP
230 @START1 PSHS D
240     LDA @STORE NO OF CHARS PRINTED
250     CMPA #200
260     BLO @OUT1
270     CLR @STORE
280     CLRA
290 @HOLD JSR 41194 GET$ ROUTINE
300     CMPA #32 SPACE PRESSED
310     BNE @HOLD IF NOT WAIT
320 @OUT1 PULS D
330     INC @STORE
340     RTS
350     END
```

**INTRODUCTORY OFFER**

**For ZX81 Users, a New Ram-Pack Anti-Wobble Module**

REGISTERED DESIGN

Designed by professionals, the **IDM 90** offers a no nonsense approach to eliminate whitecut caused by Ram Pack wear and tear.

The **IDM 90** is compact with a superb plastic coated finish in four attractive colours: black, red, yellow and white.

(Larger model No. **IDM 91** for printer facility).

Price: £4.60 inc. VAT P&P 70p. Send cheque/PO to:

IDM Products,
**Gorof Road, Ystradgynlais, Swansea. Tel: 0639 842404**

***(Money refunded if not delighted)***

POPULAR Computing WEEKLY **Back Issues**

Almost all the copies of PCW that you missed can still be bought as back issues for only 50p including postage and packing.

An index of the contents of the 36 issues published in 1982 is now available from the Publishers for only £1.20. It includes full details of all the programs, routines, reviews and news that you might have missed.

Please send me the following back issues at 50p each

Total £

Please send me a copy of the 1982 PCW Index at £1.20

I enclose a cheque/postal order for £

Name

Address

**Please return to Back Issues, PCW, 12-13 Little Newport Street, London WC2R 3LD.**

**Spectrum 48k**

**MAKE YOUR OWN TV FILMS!**

with LIVE ANIMATION & MUSIC

**SAVE them...**

& AMUSE FRIENDS AND FAMILY WHEN YOU PLAY THEM BACK!

new EXCITING!

ORDER MACRO CONSTRUCTION & ANIMATION CASSETTE NOW £7

- SPECIAL MACRO-PROGRAMMING TECHNIQUES ALLOW YOU TO:-
- CALL-UP ANY MEMBER OF CAST, INCLUDING T.V.O. HELICOPTER AND A HOST OF 'PERSONNEL' IN A CHOICE OF NEARLY 30 'CALLS' MAKE EACH ANY COLOUR - LARGE ONES CAN BE IN TWO COLOURS!
- THEY WALK, RUN, CLIMB & FLY.
- BUILD HOUSES, CHURCHES ETC. IN A FLASH & SMASH THEM
- UP TO 15 MINS. PER "FILM", OR MORE IF YOU'RE A GOOD DIRECTOR
- MAKE CHARACTERS 'SPEAK' USING ANNOTATIONS AS IN STRIPS.
- FULL COMPUTER-PROMPTING TO SAVE YOU MAKING ERRORS.
- INSTANT PLAYBACK, EDITING AND DELETING AS YOU GO ALONG!
- MOST COMMANDS ARE A SINGLE KEY-STROKE, WITHOUT 'ENTER'
- COMPOSE YOUR OWN TUNES USING THE SPECIAL THREE-OCTAVE CHROMATIC MUSIC COMPOSER, WHICH ALLOWS YOU TO LISTEN, CORRECT AND EDIT AT EACH NOTE ... IF YOU NEED TO!
- STORE UP TO NINE 30-NOTE TUNES TO 'CALL-UP' AT ANY TIME IN A STORY ... COMPUTER GIVES EACH A NUMBER IN MEMORY
- CHANGE TUNES AT ANY TIME, EVEN WHILST MAKING A 'FILM'.
- YOU CAN EVEN ADD PERSPECTIVE TO BUILDINGS, ROADS ETC.
- NO SPECIAL SKILLS OR COMPUTER KNOWLEDGE NEEDED . . . JUST IMAGINATION!

pinehurst data studios 69 PINEHURST PARK WEST MOORS, WIMBORNE DORSET BH22 0RP

IMPORTANT: FOR 48K SPECTRUM ONLY

NOW OPEN!

# SOFT TOUCH OF LONDON

YOUR NEW SOFTWARE DEALER IN NW5, CELEBRATES ITS OPENING WITH A SPECIAL INTRODUCTORY OFFER:

## 10% DISCOUNT

ON ALL SOFTWARE PURCHASED

COME AND SEE US NOW AT:

**12 DARTMOUTH PARK HILL**
**LONDON NW5**
(100 yards from Tuffnel Park Tube)

NB. EFFICIENT MAIL ORDER AVAILABLE
SAE BRINGS LATEST LIST

# Audiogenic

## ATTENTION PROGRAMMERS

**OBJECTIVE** To increase the range of computers we service taking into account new machines on the horizon that are destined to make a large impact on the consumer market.

**REQUIRED** 4 programmers of high ability and proven track record on popular micros to work with us on new projects of your choice related to our existing product portfolio. Working in a place of your choice but in close contact with our present staff of ■ people.

**REWARD** For your abilities you would expect to earn in excess of £30,000 per annum in a financial environment designed to let you retain the maximum amount through prudent tax and legal advice.

**CONTACT** in writing and in strictest confidence giving full details of your career to date with examples of your work if possible. Mark your application Confidential and address it to Martin Maynard. I will arrange an informal meeting without obligation to discuss our plans.

**AUDIOGENIC LTD**
**34-36 Crown Street**
**Reading, Berks**

# cable software

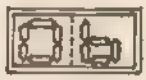
## URGENTLY REQUIRE

ORIGINAL, MACHINE CODE GAMES PROGRAMS FOR THE

## Commodore 64 - VIC 20
## ZX Spectrum - Oric
## Dragon - BBC - Electron

We have an international dealer & marketing network which will ensure maximum sales potential for your program.

Write in confidence to: **Software Development Director**
**Cable Software Limited**
**Cape House**
**52 Limbury Road**
**Luton, Beds. LU3 2PL**
or telephone: **Luton 591493**



CABLE

# In reverse

***Trevor Toms** continues his machine code series for the Spectrum – part three*

Last week we looked at the storage on simple data items and glanced at how the same ideas could be extended into the machine code equivalent of arrays. The next stage of this development is to consider how expressions can be evaluated and assigned to variables.

The direct comparison with Basic is that we are trying to write the equivalent of:

```
LET x = b(4) * 6 + 2
```

in machine code.

The first step is to rewrite your expression in "reverse Polish" notation — just like calculators of a few years back (and today if you're lucky enough to afford a Hewlitt Packard!).

So our expression above would be written as:

```
b(4) (stack)
6    (stack)
*
2    (stack)
+
```

giving a final result which will be stored in data area X using methods adopted last week.

Each operator (eg. * or + in this case) operates on the top two stacked items to give a resulting value on the top of the stack. If you've used Forth, you'll be very familiar with this concept — in fact, one reason why Forth is so fast is because the concepts translate very readily into machine code.

As a good guideline, try to keep to a strict convention regarding the use of registers in your routines. Personally, when writing a "Basic translation" program I use the *HL* registers to hold the "latest result" of any expression, the *DE* registers to hold array subscripts or second operand from an arithmetic operation, and the stack to hold the "latest result" when a nested expression is required.

Once again, it is worth stressing that this is not necessarily the best way to write machine code, but it is safe and helps assure working code until you have built up enough confidence to spread your horizons.

So we can now translate the small example above into machine code as follows:

```
b(4)    LD    DE,4
        CALL  GET$ITEM  ;see last week
  6     LD    DE,6      ;direct value
  *     CALL  MUL16     ;see 1st week
  2     LD    DE,2      ;direct value
  +     ADD   HL,DE     ;res 1t in HL
LET x=  LD    (X),HL
```

Since the *MUL16* and *DIV16* routines leave their result in *HL*, you can see that the code required to evaluate this type of expression is extremely compact.

The equivalent of Basic functions becomes only a little more complex. By writing a series of small subroutines which operate on the value in registers *HL* and leave the result in *HL*, you can simulate most of the Spectrum functions quite easily. Listing 1 gives a handful of subroutines that simulate a fair proportion of the normal functions.

Remember that you cannot easily use floating point or strings in machine code without some degree of effort, so functions such as *Sin, Log, STR$*, etc. are not included in this list. Nevertheless, you can write some extremely powerful programs without these functions. In future articles you'll see how some of these limitations can be overcome.

The routines are: *Equal, Not$Equal, Greater$Than, Less$Than, ZxAnd, ZxOr, ZxNot, ZxIn, ZxPeek*. In each case (except the last two), the routine operates on two values supplied in the *HL* and *DE* register pairs, leaving a "true" or "false" result in *HL*. As with Basic, "true" is represented by the value 1, while "false" is given by the value 0. It may have been more logical to use the value –1 (0FFFFh) for "true", but this would be inconsistent with Basic, and would therefore require some additional translation when rewriting your Basic program in machine code.

The last two are examples of the way that true binary functions can be implemented — the subroutines operate on the value in *HL* and leave the result in *HL*. In practice, you can write the "peek" routine more efficiently by using in-line code instead of calling a subroutine, but, as I have said earlier, keeping things consistent is best for now.

Below is a better example of how to use some of these routines alongside an equivalent Basic program (see also listing 2).

Next week we start to look at ways of using the Spectrum hardware from machine code — this is where things start hotting up! ■

By Trevor Toms, author of *The Spectrum Pocket Book*, published by Phipps Associates.

```
 5 LET result = 0
                LD    HL,0              ;set RESULT to zero
                LD    (result),HL
10 LET char = CODE INKEY$: IF char = 0 THEN GO TO 10
       L10      LD    A,1               ;select keyboard
                CALL  SELDEV
                CALL  AWAIT$KEY         ;wait for a key
                LD    L,A               ;put keycode into HL
                LD    H,0
                LD    (char),HL         ;and save it
20 IF (char < 48) OR (char > 58) THEN GO TO 100
                LD    DE,48             ;check if < 48
                CALL  LESS$THAN
                LD    A,L               ;test if true reply
                OR    A
                JR    NZ,L100           ;yes -- jump forward
                LD    HL,(char)         ;reload character value
                LD    DE,58             ;check if > 58
                CALL  GREATER$THAN
                LD    A,L               ;test for true reply
                OR    A
                JR    NZ,L100           ;jump forward if true
30 LET result = (result * 10) + (char - 48)
                LD    HL,(result)       ;load current result
                LD    DE,10
                CALL  MUL16             ;multiply by 10
                PUSH  HL                ;save on stack
                XOR   A                 ;clear carry flag
                LD    HL,(char)         ;load character value
                LD    DE,48
                SBC   HL,DE             ;subtract 48
                POP   DE                ;get (RESULT * 10) into DE
                ADD   HL,DE             ;add to latest result
                LD    (result),HL       ;resave
40 GO TO 10
                JR    L10               ;jump back for more
100 PRINT result
       L100     LD    A,2               ;select screen output
                CALL  SELDEV
                LD    BC,(result)       ;load result value
                CALL  PRINT$NUM         ;print it
110 STOP
                RET                     ;return to Basic
```

Unlock Your Imagination
SCOPE
Computer Graphics Language
A VERY POWERFUL, TRUE MULTITASK LANGUAGE
AS FAST AS MACHINE CODE
SIMPLER THAN BASIC
Write Machine Code in a fraction of the time currently required
SCOPE is available from most good quality dealers and selected branches of
WHSMITH
details of how to get games published contact
PRICE
£11.95
TECHNICAL DETAILS
SCOPE is a fully structured multitask language specifically for writing graphics, animation and sound. Being fully compatible with BASIC it is ideal for writing both arcade and adventure style games. Additionally, with SCOPE present in high memory it can be used as an assembler with SCOPE words as plain language mnemonics. Therefore no knowledge of machine code is required. The language is extremely easy to comprehend and is very powerful indeed providing many features not available from BASIC.
SCOPE HAS TO BE USED TO BE BELIEVED
48K SPECTRUM
CLIP THE COUPON NOW AND UNLOCK YOUR IMAGINATION
Post to ISP Marketing Ltd, Crown House, 38b High Street, Godalming, Surrey
Tel: Godalming (04868) 24151 Please rush me copies of the SCOPE computer graphics language tape and instruction manual at £11.95 (p&p free)
(Cheques payable to ISP Marketing Ltd)
Block capitals please
Name
Address
Dealer Enquiries Welcome

```
Addr Hex        Op    Operands

FF5B            EQUAL:
FF5B A7          AND   A
FF59 ED52        SBC   HL,DE
FF5B 210000      LD    HL,0
FF5E C0          RET   NZ
FF5F 23          INC   HL
FF60 C9          RET
FF61            NOT$EQUAL:
FF61 A7          AND   A
FF62 ED52        SBC   HL,DE
FF64 210100      LD    HL,1
FF67 C0          RET   NZ
FF68 2B          DEC   HL
FF69 C9          RET
FF6A            GREATER$THAN:
FF6A EB          EX    DE,HL
FF6B            LESS$THAN:
FF6B A7          AND   A
FF6C ED52        SBC   HL,DE
FF6E 7C          LD    A,H
FF6F 17          RLA
FF70 210000      LD    HL,0
FF73*E20000      JP    PO,LTB
FF76 3F          CCF
FF77            LTB:
FF77 ED6A        ADC   HL,HL
FF79 C9          RET
FF7A            ZXPEEK:
FF7A 6E          LD    L,(HL)
FF7B            PKB:
FF7B 2600        LD    H,0
FF7D C9          RET
FF7E            ZXIN:
FF7E 44          LD    B,H
FF7F 4D          LD    C,L
FF80 ED68        IN    L,(C)
FF82 18F7        JR    PKB
FF84            ZXNOT:
FF84 7C          LD    A,H
FF85 B5          OR    L
FF86 210000      LD    HL,0
FF89 C0          RET   NZ
FF8A 23          INC   HL
FF8B C9          RET
FF8C            ZXAND:
FF8C 7C          LD    A,H
FF8D A2          AND   D
FF8E 67          LD    H,A
FF8F 7D          LD    A,L
FF90 A3          AND   E
FF91 6F          LD    L,A
FF92 C9          RET
FF93            ZXOR:
FF93 7C          LD    A,H
FF94 B2          OR    D
FF95 67          LD    H,A
FF96 7D          LD    A,L
FF97 B3          OR    E
FF98 6F          LD    L,A
FF99 C9          RET
Symbols:
EQUAL   FF5B    NOT$EQ FF61
GREATE  FF6A    LESS$T FF6B
LTB     FF77    ZXPEEK FF7A
PKB     FF7B    ZXIN   FF7E
ZXNOT   FF84    ZXAND  FF8C
ZXOR    FF93
No error(s)
```

```
Addr Hex        Op    Operands

FA00            SELDEV:
FA00             EQU   1601H
FA00            PRINT$NUM:
FA00             EQU   1A1BH
FA00            AWAIT$KEY:
FA00             EQU   15D4H
FA00            LESS$THAN:
FA00             EQU   OFF6BH
FA00            GREATER$THAN:
FA00             EQU   OFF6AH
FA00            MUL16:
FA00             EQU   65000
FA00             ORG   64000
FA00            ENTRY$POINT:
FA00 210000      LD    HL,0
FA03*220000      LD    (RESULT),HL
FA06            L10:
FA06 3E01        LD    A,1
FA08 CD0116      CALL  SELDEV
FA0B CDD415      CALL  AWAIT$KEY
FA0E 6F          LD    L,A
FA0F 2600        LD    H,0
FA11*220000      LD    (CHAR),HL
FA14 113000      LD    DE,48
FA17 CD6BFF      CALL  LESS$THAN
FA1A 7D          LD    A,L
FA1B B7          OR    A
FA1C*2000        JR    NZ,L100
FA1E*2A0000      LD    HL,(CHAR)
FA21 113A00      LD    DE,58
FA24 CD6AFF      CALL  GREATER$THAN
FA27 7D          LD    A,L
FA28 B7          OR    A
FA29*2000        JR    NZ,L100
FA2B*2A0000      LD    HL,(RESULT)
FA2E 110A00      LD    DE,10
FA31 CDE8FD      CALL  MUL16
FA34 E5          PUSH  HL
FA35 AF          XOR   A
FA36*2A0000      LD    HL,(CHAR)
FA39 113000      LD    DE,48
FA3C ED52        SBC   HL,DE
FA3E D1          POP   DE
FA3F 19          ADD   HL,DE
FA40*220000      LD    (RESULT),HL
FA43 18C1        JR    L10
FA45            L100:
FA45 3E02        LD    A,2
FA47 CD0116      CALL  SELDEV
FA4A*ED4B0000    LD    BC,(RESULT)
FA4E CD1B1A      CALL  PRINT$NUM
FA51 C9          RET
FA52            CHAR:
FA52 0000        DEFW  0
FA54            RESULT:
FA54 0000        DEFW  0

Symbols:
SELDEV  1601    PRINT$  1A1B
AWAIT$  15D4    LESS$T  FF6B
GREATE  FF6A    MUL16   FDEB
ENTRY$  FA00    L10     FA06
L100    FA45    CHAR    FA52
RESULT  FA54
No error(s)
```

# Programming by angles

*Czes Kosniowski explains the use of trigonometry in programming*

Seldom can we directly measure the heights of tall buildings, hills, trees, etc. One way to find the height of a building or tree is to stand away from the object. Now measure the angle between the horizontal and the highest point of the object (using a clinometer, which is just a glorified protractor), then measure the distance between you and the object. By drawing a scale drawing the height of the object can be readily estimated. See Figure 1.

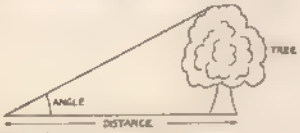



**Figure 1**

You couldn't use the same technique to measure the height of a mountain peak which is miles away and covered in clouds. The clouds would get in your way, and you couldn't measure the horizontal distance. An instrument such as a tellinometer would help. This uses radar to locate the top of the mountain. It also measures the angle and distance between you and the top. A scale drawing would provide a way of calculating the height of the mountain. (Figure 2).

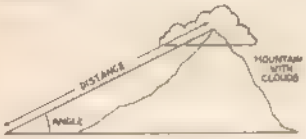



**Figure 2**

As a further example suppose we wanted to find the width of a large pond or lake (see Figure 3). A scale drawing drawn from the measurements made could be produced and the required distance estimated.

**Figure 3**

Here is a related example. A navigator is at a certain position A. He is 150 km due west of city B and 188 km from city C. The angle between the two cities is ■ degrees measured from his position. How far apart are the two cities? Again, a scale drawing could provide the answer.

Although scale drawing will provide answers to the problems mentioned above they are rough and ready. And it is not always practicable or accurate to produce scale drawings. An alternative approach is to do it by trigonometry using your Commodore 64.

## The trigonometry functions

The three important trigonometric functions are SIN (sine function), COS (cosine function) and TAN (tangent function). They each represent ratios of the various sides of a right-angled triangle. For example, the triangle in Figure 4 is a right-angled triangle. The angle at the corner of the left is denoted by the symbol X. The three sides of the triangle will be referred to as the side adjacent to X, the side opposite X, and the hypotenuse (the longest side).

$$TAN(X) = \frac{\text{opposite}}{\text{adjacent}}$$

$$SIN(X) = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$COS(X) = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Some useful values to remember are the following:

```
SIN(0°)  = 0
SIN(30°) = 0.5
SIN(45°) = 1/SQR(2)
SIN(60°) = SQR(3)/2
SIN(90°) = 1

COS(0°)  = 1
COS(30°) = SQR(3)/2
COS(45°) = 1/SQR(2)
COS(60°) = 1/2
COS(90°) = 0

TAN(0°)  = 0
TAN(30°) = 1/SQR(3)
TAN(45°) = 1
TAN(60°) = SQR(3)
```

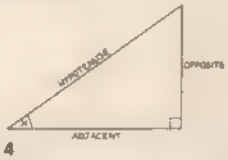



**Figure 4**

If you know the angle X and one of the three lengths of a right-angled triangle then you can find the other two lengths. For example, if you know the angle X and the length of the adjacent side then the other two lengths are given by the following formulae.

```
opposite   = TAN(X) * adjacent
hypotenuse = adjacent/COS(X)
```

Another way of describing the trigonometric function is by using a circle of radius 1 unit. Measure out the angle required as shown in Figure 5. The values of the various trigonometric functions are indicated.

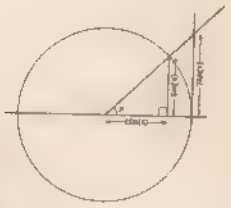



**Figure 5**

Mathematically distances are measured horizontally from left to right and vertically upwards. This explains why, for instance, ■ Figure 6 *Cos(X)* has a negative value.

**Figure 6**

You can obtain SIN, COS and TAN of an angle X by typing *Print Sin(X)*, etc, substituting the appropriate value of X. The only possible problem is that the Commodore 64, like most microcomputers, expects the angles in radians, not degrees. Fortunately, degrees can be turned into radians and vice versa very easily.

First of all, what is a radian? Draw a circle of radius 1 unit. Measure along the circumference of your circle a distance which is equal to the radius of the circle. The angle subtended by this arc is 1 radian. 1 radian is approximately 57°. See Figure 7.

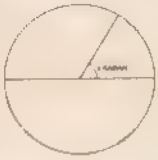



**Figure 7**

The number π is both remarkable and famous. It is defined to be the ratio of the circumference of a circle to its diameter. The (approximate) value of π is stored in your Commodore 64. Simply type *Print* π to reveal the value stored. In a circle of radius 1 unit the diameter ■ 2 units. Thus the circumference of this circle is 2*π and so there are 2*π radians in a complete circle. Since there are 360 degrees in a complete circle we see that:

360° = 2*π radians, and
180° = π radians

We can convert degrees to radians and vice versa quite easily with the following formula:

X degrees = X*π/180 radians
Y radians = Y*180/π degrees

The following program can be used to find lengths of right-angled triangles. You need to input an angle and one distance. Program 1 calculates the other two lengths.

### Inverse functions

Suppose we know the lengths of the sides of a right-angled triangle, can we determine the various angles? The answer is yes, and we use the inverse trigonometric functions to do this. Given an angle *X* then *Tan(X)* gives us a number, the tangent of the angle *X*. Conversely, given a number *N* we could find an angle whose tangent is that number. Such an angle could then be called the inverse tangent of *N*. It is usually denoted by *Atn(N)*, the arc tangent of *N*.

Look at the triangle in Figure 8.

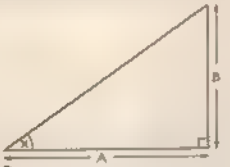



**Figure 8**

If we know the values of *A* and *B* then we could find the value of the angle *X*. We know that *Tan(X) = B/A*, thus *X = Atn(B/A)*. You can put in the appropriate values in this expression and get your Commodore 64 to print out the answer. Of course, the answer would be in radians. To get an answer in degrees you need to multiply the result by 180/π.

The trigonometric functions SIN and COS also have inverse functions denoted by *Asn* (arc sine) and *Acs* (arc cosine) respectively. *Asn(N)* is that angle whose sine is N; similarly *Acs(N)* is that angle whose cosine is N. Unfortunately the Commodore 64, in common with many other microcomputers, does not contain these functions in its basic. However they can be easily obtained from the *Atn* function.

To see how we obtain *Asn* from *Atn*, look at the right-angled triangle with a hypotenuse of length 1 unit in Figure 9.

**Figure 9**

Now suppose that we know the value of *B*, and we want to find the angle *X*. We know that *Sin(X) = B* so that *X = Asn(B)*, but as was mentioned *Asn* isn't present in the Commodore 64. If we knew the value of *A* then we could use *Atn* since *X = Atn(B/A)* also. To find *A* we use Pythagoras' theorem.

Recall the theorem of Pythagoras. In words Pythagoras' theorem states that the square of the hypotenuse of a right-angled triangle is equal to the sum of the squares of the other two sides. In symbols we have $C^2 = A^2 + B^2$ where *C* is the length of the hypotenuse. Since our hypotenuse is of length 1 we have:

1 = A*A + B*B

or

A*A = 1 = B*B

and so

A = SQR(1 - B*B)

Since *X = Atn(B/A)* we obtain

X = ATN(B/SQR(1 - B*B))

also, *Asn(B) = X*, and so we obtain

ASN(B) = ATN(B/SQR(1 - B*B))

In a similar way we could produce a formula for *Acs(A)*, one such is given below:

ACS(A) = π/2 - ATN(A/SQR(1 - A*A))

You should notice that *Acs(A) = π/2 - Asn(A)*.

Appendix H of the Commodore 64 User Manual contains other examples of mathematical functions which may be useful. ■

This is an extract from *Mathematics on the Commodore 64* by Czes Kosniowski, published by Sunshine Books.

```
10 REM PROGRAM FOR RIGHT-ANGLED
TRIANGLES
20 PRINT CHR$(147) "     RIGHT-ANGLED
 TRIANGLES" CHR$(17)
30 PRINT "THIS PROGRAM ENABLES
YOU TO FIND THE"
40 PRINT "SIDES OF A RIGHT ANGLED
TRIANGLE"
50 PRINT "PROVIDED YOU KNOW ONE
SIDE AND ANGLE." CHR$(17)
60 PRINT "                  N%
                          N %"
70 PRINT "                N  %
                        N   %"
80 PRINT " HYPOTENUSEN     %OPPOSITE
                     N     %"
90 PRINT "           NANGLE %
                     ####### "
95 PRINT "           ADJACENT" CHR$(17
)
100 REM INPUT DETAILS
110 INPUT "ANGLE. IN DEGREES. ";X
120 IF X<=0 OR X>=90 THEN PRINT
"ERROR - NOT A TRIANGLE":GOTO 110
130 PRINT CHR$(17) "WHICH SIDE DO
YOU KNOW? 1 (OPPOSITE)"
140 PRINT "2 (ADJACENT) OR 3
(HYPOTENUSE)."
150 INPUT "TYPE 1, 2 OR 3 ";T
160 IF T<1 OR T>3 OR T<>INT(T)
THEN 150
170 PRINT CHR$(17) "TYPE IN THE
LENGTH OF THIS SIDE."
180 INPUT "LENGTH ";L
190 IF L<=0 THEN PRINT "FUNNY -
TRY AGAIN":GOTO 180
200 REM CONVERT TO RADIANS
210 X=X/180
220 REM THE SPLIT OFF
230 ON T GOSUB 300,350,400
240 PRINT CHR$(17) "     THAT'S IT -
ANOTHER GO Y OR N?"
250 GET G$:IF G$<>"Y" AND G$<>"N"
THEN 250
260 IF G$="Y" THEN RUN
270 PRINT CHR$(147) "BYE FOR NOW."
:END
300 REM OPPOSITE SIDE KNOWN
310 PRINT CHR$(17) "ADJACENT SIDE:"
L/TAN(X)
320 PRINT "   HYPOTENUSE:" L/SIN(X)
330 RETURN
350 REM ADJACENT SIDE KNOWN
360 PRINT CHR$(17) "OPPOSITE SIDE:"
TAN(X)*L
370 PRINT "   HYPOTENUSE:" L/COS(X)
380 RETURN
400 REM HYPOTENUSE KNOWN
410 PRINT CHR$(17) "OPPOSITE SIDE:"
SIN(X)*L
420 PRINT "ADJACENT SIDE:" L*COS(X)
430 RETURN
```

# An easy life for some

***Keith and Steven Brain** take a look at programming aids for the Dragon 32*

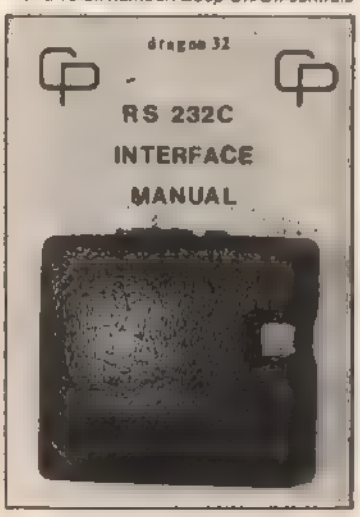
Moving on from sound and graphics (*PCW* 24-30 November) here are some programming aids for the Dragon 32 which can make your life much easier.

*Toolkit* (Premier) is for those who prefer to stick to Basic rather than delve into machine code. It is available on disc or as an Eprom (within Delta or separate) and it adds over 50 new commands to Basic. Although programs incorporating the new commands will only run if *Toolkit* is present, the program also has some first-class editing commands which can be used to edit any program.

The full screen editor is a twin cursor type, which allows you to copy characters from the editing cursor to the normal cursor. You can use the full screen editor in co-operation with the Dragon's standard editing facilities (so that there are not a lot of new commands to remember), or you can recopy a whole line. To save the problem of text scrolling off the top of the screen, you can move text to one of two other text screens, and also swap text screens.

Extensive search and replace facilities are included and *Plan* gives you total control over output to a printer controlling factors such as paging, column length, margin, etc. Extra cassette handling commands are *Cdir* (gives a directory of a tape) and *Cappend* (appends from tape).

*Inkey* is like *Inkey$*, but gives the Ascii value of a key pressed, while *Key$* and *Key* are like *Inkey$* and *Inkey*, but with built-in auto-repeat. *Inp n,A$* gives you a controllable length for an *Input*, so that you can prevent an ignorant (or malicious) user entering an illegally long string. *Deek* and *Doke Peek* and *Poke* two bytes at a time with a 16-bit number. *Beep On/Off* controls




keyboard beep and *Break On/Break Off* enables/disables the break key.

*Echo x–y,z* copies lines *x* to *y* from *z* downwards and *Prune* removes everything after a Rem statement. *Vars* prints the active variable in a program, *Pause* waits for a specified number of milliseconds and *Hang* waits for a key to be pressed. A number of commands are provided to control low-res graphics. The comprehensive error handling commands (*Erl, Err, Error n, Error Goto n, Error Off, Resume, Resume Next,* and *Resume Goton*) can be used to prevent your program from stopping if there is an error.

The *Resume* commands are important, as they allow you to continue immediately with your program (unlike the error commands in *Dragondos*). *Old* attempts to rescue a crashed program. You are allowed to *Goto* and *Gosub* line numbers specified as variables and you can program the keys *A-H* with up to 23 characters including *Enter*. For example, if you use:

```
PROGA "PAGE" + CHR$(13) + "BEEP" + CHR$
(13) + "HANG" + CHR$(13) + "RUN" + CHR$(13)
```

then when you press *Shift* and *A*, it will *Page* your program, *Beep, Hang* and then *Run*.

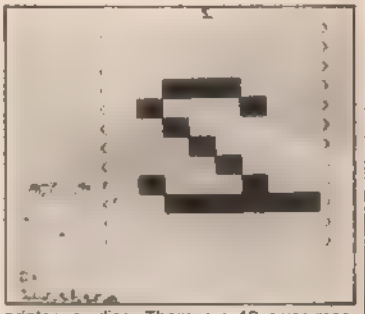
Even after all that description we have still left out some very useful features, so you can probably understand why we believe the Premier *Toolkit* is outstanding value at £29.95.

*Encoder 09* (Premier) is a monitor, assembler, and disassembler for the Dragon which comes on cassette, disc (Delta), or Eprom (available as an option on the Delta Dos cartridge). The comprehensive manual is 52 pages long and includes details of the 6809 registers, instruction sets and different types of addressing, as well as the operation of the system.

The program starts up in the monitor mode, where a colon prompt before the cursor informs you that you are using the monitor. Typing M moves you to Basic and *&M* returns to the monitor. You can examine and change memory locations and search the memory for a Hex number or an Ascii string.

Block moves are allowed and you can execute machine code routines from the monitor, which will convert or calculate Hexadecimal, Octal, Binary and Decimal values, and also has extensive breakpoint routines. It is fully compatible with Dragon Basic and there is automatic line numbering and tabulation and a full complement of pseudo-opcodes.

You can incorporate assembly language within Basic programs by enclosing the code between square brackets. You can perform a test assemble to check the syntax before moving on to the real thing and assembly can be to memory, cassette,



printer, or disc. There are 19 error messages to help sort out any problems.

*Encoder 09* costs £29.95 on tape, £34.95 on Eprom as a Delta addition, and £39.95 on cartridge. We found it easy to use and, if you want to get into machine code programming, then this is a sound investment.

*Memory Module* (Moray Microsystems) is a low power Cmos static Ram memory module running off Ni-Cads which are trickle charged when the computer is on. It can be used to provide instant memory back-up in case of a system crash or provide a temporary, reusable, "cartridge" facility. The unit is larger than a normal cartridge and, to prevent it flopping about in the expansion port, there are small plastic feet underneath the case. Before turning the Dragon off, you must remember to turn the memory protection switch on and, before you recover or store programs, you must put the memory protection off.

It is easy to store and retrieve a program using a small machine code routine. You could put this routine at the end of a Basic program and instead of *Csaving* the latest copy of your program every half an hour (in case the gremlins get loose in the mains supply), you could dump it into the memory module.

The module is available in a number of Ram configurations (4 to 14K) but, for example, will hold 4K for 63 days using ultra low power Cmos (£42) or 16.6 days using lower power Cmos (£39). This product is rather specialised, but would be of value in program development (especially if you don't have a disc system) or in education where you might want to change the cartridge contents at regular intervals.

The standard Dragon 32 interface is of the parallel Centronics type, although the new Dragon 64 also has a serial RS232 port. Many other machines have RS232 and the addition of this facility allows you to communicate more widely.

*RS232C Interface* (Cotswold Computers/CP Engineering) is a cartridge which comes with a detailed manual which explains the RS232 standard and how to transmit and receive data. Two demonstration programs are provided, the first being an interface test and the second a program to transmit the graphics screen from one Dragon to another (as we only

had a single interface we could not test the latter). The baud rate is easily controlled by an external, colour-coded, dip switch, and a brief description of the electronic specification is included.

It allows you to use any serial printer on the Dragon, communicate between your Dragon and any other machine with an RS232 interface, and eventually ■ communicate through a modem (which is currently under development) to the whole world, although of course you still need to write the software to control it! This is another rather specialised product which

will be of interest to the minority, although no doubt invaluable to them. The interface has already been used to connect the Dragon to a number of pieces of specialised scientific equipment.

In addition to serial and parallel ports, it is also useful to have straightforward input and output connections for control applications. *Dragon Interface* (Moray Microsystems) is an input/output module which allows the Dragon cartridge port to be used as a 4 or 8 input port (opto-isolated) with up to 8 relay output ports. Once the module has been configured, inputs are easily ready by *Peeking* location *49152* and relays operated/released by *Poking* appropriate values to *49153*.

The module will accept dc inputs from +3 to +15 volts and the output channels will switch up ■ 220 volts at 0.5 amps. Data at the input channels is indicated by integral leds and connections to the unit are made via clearly marked terminal blocks, once you have managed to persuade four very small hex-head screws to come loose.

Possible applications ■ this unit are many and varied (we hope to report further on this in the near future), for example, you could easily control your model railway (or robot?). Another obvious application ■ to build a sophisticated intelligent burglar alarm system which can tell the difference between your cat sitting on the mat or rattling the window and a real threat.

The price depends on the specification, but it ■ based on a flat charge of £20 for 4 inputs or £28 for ■ inputs and then £3 per relay output (so that a full specification 8 input/8 output module costs £52). An add-on power module is also being made available (at around £40) which will switch 13 amp mains loads so that you can really let your computer control your central heating, greenhouse etc. This unit certainly extends the power of your Dragon into interesting control applications.

Last, but not least, there are the lightpens which plug directly into the joystick ports of the Dragon and allow you to control the execution of your programs without touching a key. The Trojan Lightpen (Trojan Products) is a relatively simple device supplied with a program on cassette and a combination of instructions printed on the cassette insert and incorporated into the program. The main menu allows you to select options to run through the instructions, draw a simple histogram of light level, play a game of *Nim*, use the light pen to select which notes to sound, or draw directly on the screen. The drawing routine only uses *Pmode 1*, so the results are rather crude and you still have to use the keyboard as well, which rather defeats the object of using a lightpen!

Its value seems rather limited, but it is relatively cheap at £10.

The Datapen Lightpen (Datapen Microtechnology) is supplied with comprehensive instructions and a tape with three programs. It differs from all other light pens available for the Dragon in that it is a far more sophisticated (and rather more expensive at £25) beast. Important unusual features are a button mounted on the pen itself, which controls operation, and an led which indicates data capture.

The pen is also easier ■ use than most, because of its larger size and because the end is flattened and covered with non-slip rubber. It also seemed quite insensitive to changes in ambient light.

The first program provided is an introduction which allows you to work through instructions on how the pen works, produce a low-res flowchart, or find an *X,Y* screen position. The second program is *Sketch* ■ which you can draw directly on

the screen using any *Pmode*. Four options can be selected with the pen (*Draw, Erase line, Blank Move* and *Paint*) and, by also using the keyboard, you can save to tape, draw a circle, and change the accuracy factor and measurement bars. This program uses ■ much faster screen strobe (which can easily be modified) and it clearly demonstrates the superiority of the Datapen.

The *Shape Create* program is very useful, as it allows you to produce designs directly on a screen matrix and then save these ■ a "library" in memory or on tape and use them later. The *Create more sprites* option allows you ■ design scaled-up sprites on the screen, while a normal sized version is drawn alongside, with total control by the lightpen. If you select the *Create Drawing* mode, then you can pick a sprite from the library you created and put it at any screen position ■ any of four 90-degree angles.

Although we have tended to be rather cynical about the value of lightpens in the past, the Datapen has transformed our views and is no doubt the best buy for anyone with a serious use.

Adding on ■ the facilities of all these products at the same time would certainly produce one hell of a machine, but with all those "bolt-on-goodies" we are sure that you would also need some "go-faster" stripes as well. ■

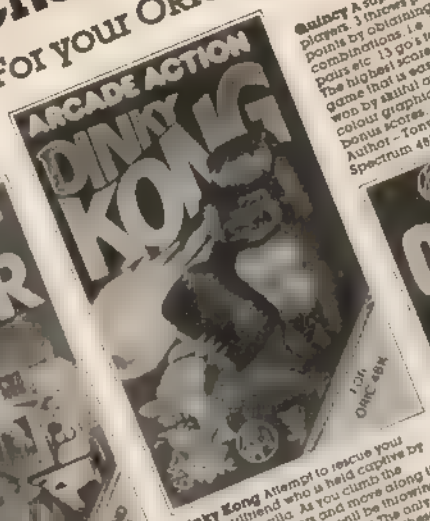
| Firm | Program | Cost |
|---|---|---|
| Premier<br>208 Croydon Road<br>Anerly<br>London SE20 7YX | *Toolkit*<br>*Encoder 09* | £29.95<br>£29.95* |
| Moray Microsystems<br>17 Kirkton Place<br>Elgin IV30 3JR | *Memory Module*<br>*Dragon Interface* | £42†<br>£52† |
| Cotswold Computers<br>6 Middle Row<br>Chipping Norton<br>Oxfordshire | *RS232C* | |
| Trojan Products<br>166 Derlwyn<br>Dunvant<br>Swansea | *Lightpen* | £10 |
| Datapen Microtechnology<br>Kingsclere Road<br>Overton<br>Hants | *Lightpen* | £25 |

*Tape. †Varies according to option.

# The REAL Challenge!

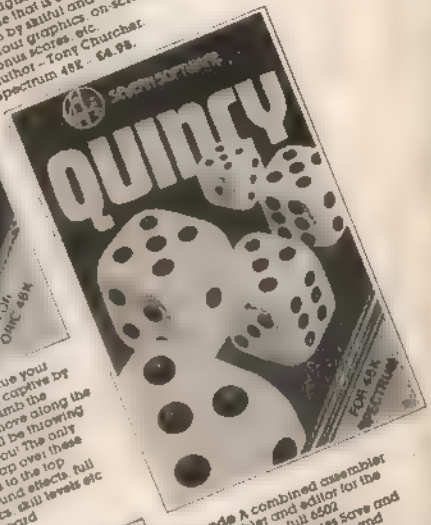
## For your ORIC or SPECTRUM

**Jogger** Guide your joggers across a 4 lane motorway and crocodile infested river to reach their safe haven through the gap in the fence. Each time a jogger is safely home the next one will have to encounter more lorries and cars on the motorway but fewer crocodiles and logs in the river. Full on-screen instructions. M/code sound effects and full action colour graphics.
Oric Author – Adrian Sheppard
Spectrum Author – Mike Howard
Oric 48K £6.95 Spectrum 16/48K – £4.95.




**Dinky Kong** Attempt to rescue your lovely girlfriend who is held captive by the angry gorilla. As you climb the connecting ladders and move along the gangways, the gorilla will be throwing barrels and fireballs at you! The only way to reach her is to leap over these obstacles and progress to the top. M/code action with sound effects, full colour action graphics, skill levels etc.
Author – Adrian Sheppard
Oric 48K – £6.95

**Quincy** A superb dice game for 2 to 6 players. 3 throws per go to try and score points by obtaining certain combinations. i.e. 3 of a kind, a run, pairs etc. 13 go's to complete a game. The highest score is the winner! It's a game that is easy to learn but can be won by skilful and thoughtful play. Full colour graphics, on-screen instructions, bonus scores, etc.
Author – Tony Churcher
Spectrum 48K – £4.95.




**Oricade** A combined assembler Disassembler and editor for the Oric + Handles full 6502 Mnemonics + Features Save and Reload M/C + Assembles and disassembles at any address + An essential tool for any serious programmer.
Author – Adrian Sheppard.
Oric 48K – £8.95.

Oric titles recommended by ORIC PRODUCTS INT. LTD

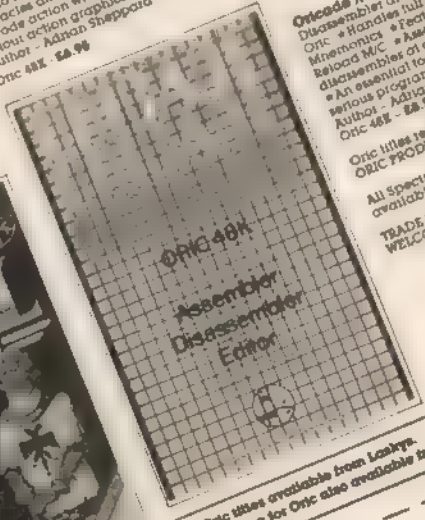
All Spectrum Software is available on Microdrive 100

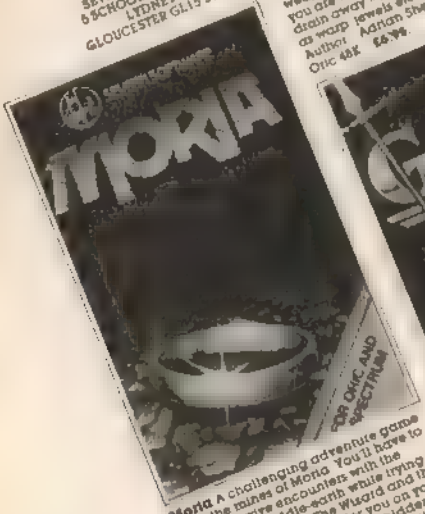
TRADE ENQUIRIES WELCOME

SEVERN SOFTWARE

SEVERN SOFTWARE
6 SCHOOL CRESCENT
LYDNEY
GLOUCESTER GL15 5TA

**Grail** You have been chosen to seek and recover the Holy Grail from the Castle Perilous. Throughout the course of your task you will have to use your skill, intelligence and logic (along with a little luck) as you encounter many foes. You will have the opportunity to gather weapons and armour to fight with but if you are wounded your strength will drain away – many other features such as warp jewels etc.
Author – Adrian Sheppard
Oric 48K – £6.95.






**Moria** A challenging adventure game set in the mines of Moria. You'll have to try and survive encounters with the monsters of middle-earth while trying to locate Durins Ring. The Wizard and the Trader may help or hinder you on your journey to find and open the hidden doors to freedom – a game that will really test your character and playing power.
Oric Author – Adrian Sheppard
Spectrum Author – Mike Howard
Oric 48K – £6.95 Spectrum 16/48K – £4.95.

All Oric titles available from Lasky's.
Dinky Kong for Oric also available from WH Smith.

Please send me (Tick box)

**SPECTRUM 16/48K**
- ☐ Jogger @ £4.95
- ☐ Quincy @ £4.95
- ☐ Moria @ £4.95

**ORIC 48K**
- ☐ Jogger @ £6.95
- ☐ Dinky Kong @ £6.95
- ☐ Moria @ £6.95
- ☐ Oricade @ £8.50
- ☐ Grail @ £6.95

I enclose Cheque/P.O. for £_____ made payable to Severn Software

Name _____

Address _____

Severn Software, 6 School Crescent, Lydney, Gloucester, GL15 5TA

All prices include VAT and P&P

Overseas P&P add 50p.

A lifetime of games in one program!

# CREATE & PLAY YOUR OWN ARCADE GAMES!

Simple to use

Software STUDIOS

## Games Designer

By John Hollis
Author of Time Gate, Aquaplane and Meteor Storm

Invaders format Asteroids format
Defender format & Beserk format

**8 GREAT GAMES INCLUDED:**

Turbo Spider · Tanks a lot · Halloween · Attack of the Mutant Hamburgers · Cyborg · Reflectron · Splot and Q-Bix

Smooth Arcade quality throughout using full colour sprites • Design your own fully animated Aliens, Ships, Missiles, Explosions • Full attack wave design (8 waves per game) • Moving background option • Full sound generation • Full movement control and scoring • Save and load YOUR OWN games to and from tape!

**£14.95**
SPECTRUM 48K
Dealer enquiries welcome.

**Marketed exclusively by Quicksilva**

| | |
|---|---|
| Games Designer | £14.95 |
| Time Gate (48K Spectrum) | £6.95 |
| Aquaplane (48K Spectrum) | £6.95 |
| Meteor Storm (16K Spectrum) | £4.95 |

I enclose cheque/P.O for _____
Please send me details of the Quicksilva Game Lords Club ☐
My Game Lords Club membership number is _____

Name _____
Address _____

Cheques payable to Quicksilva Ltd.

**Send to Software Studio, Quicksilva Mail Order, P.O. Box 6, Wimborne, Dorset BH21 7PY.**
**Telephone: (0202) 891744**

Boots, W.H. Smiths, J. Menzies, Microdealer, HMV, Harrieys, John Lewis, Computers for All and all reputable specialist computer stockists.

SPECIAL OFFER

**Quicksilva Game Lords Club Members**

£1.00 off Games Designer and £1.00 off Aquaplane and other NEW Quicksilva Games – call for details. Quote your secret membership No. on the order coupon.

Exclusive chance to Quicksilva Games Lords Club members to have their OWN games design published! Details coming soon!

# To the letter

***Ian and Damian Inger** present* Word Search *for the 32K BBC*

This program is an educational type, for use with a group of pupils rather than one person alone. The teacher has to write a short passage (20 lines of 31 characters) on the screen which then clears and the pupils are presented with a screen of coloured blocks, one for each letter. All punctuation marks and spaces are put on to the screen for the pupils.

At random intervals, all occurrences of the guess letter are filled in on the screen. At 15 guess intervals, the pupils are invited to write out a two-line message, saying what they think the passage is about.

The program is designed to encourage group discussion about the positioning of letters and the frequency of certain letters within the passage. ■

```
   :0REM  Word search
   20REM  By Ian & Damian Inger
   30REM  (c) Nov 1983
   40REM
   50REM
   60MODE7
   70PROCinit
   80PROCteacher_instruction
   90PROCenter
  100PROCpupil_instruction
  110PROCpunc
  120PROCmove
  130PROCguess
  140PROCcheck
  150R=RND(7):IF R=3 AND (A<136 OR
A>139) THEN PROCluck
  160GOTO 120
  170END
  180DEFPROCinit
  190T=0
  200G=0
  210VDU23;8202;0;0;0;
  220DIM A$(31,20)
  230DIM B$(31,20)
  240DIM T$(30)
  250*K.9"!"
  260*K.10OLD|MRUN|M
  270G$=CHR$(130)
  280S$=CHR$(255)
  290R$=CHR$(129)
  300C$=CHR$(134)
  310X1%=0:Y1%=0
  320ENDPROC
  330DEFPROCteacher_instruction
  340CLS
  350PRINT"Instructions to the teacher"
  360PRINT
  370PRINT"You should type the test
passage in     CAPITAL LETTERS only."
  380PRINT"If you make a mistake,
press the Delete key to erase it."
  390PRINT"The program will accept
20 lines of 31  characters."
  400PRINT"When you are typing the
test, the ":S$:" willmove to the next
line automatically. Youmay press
'Return' at any time to  move to the
start of the next line."
  410PRINT"When the last line is
complete, the "
  420PRINT"instructions for your pupils
will be    displayed."
  430REPEAT:PRINTTAB(0,23)"PRESS SPACE
BAR TO CONTINUE":UNTIL GET
  440ENDPROC
  450DEFPROCpupil_instruction
  460CLS
  470*FX15,1
  480PRINT"INSTRUCTIONS"
  490PRINT
  500PRINT"This is similar to Hangman.
All you haveto do is fill in the blue
squares with  letters."
  510PRINT"You will see a '£' on the
screen. This  is where you make your
guess."
  520PRINT"The '£' will always find the
next free  space for you, but you may
move the '£' around the screen with the
arrow keys ifyou wish."
  530PRINT"If your guess is right,
the £ will move to the next space."
  540PRINT"If your guess is wrong, the
£ will stay where it is."
  550PRINT"If you are lucky, the
computer will findyour guess letter on
every line and fillit in for you."
  560REPEAT:PRINTTAB(0,23)"PRESS SPACE
BAR TO CONTINUE":UNTIL GET
  570CLS
  580PRINT"Sometimes, you will be asked
 to write a short message saying what
you think the story is about. At the
end, press red   key 9 and all of your
messages will be  shown."
  590PRINT
  600PRINT"The total time taken for
you to completethe puzzle is also
shown."
  610PRINT
  620PRINT"You may press 'Return'
at any time to   see the instructions."
  630REPEAT:PRINTTAB(0,23)"PRESS
SPACE BAR TO CONTINUE":UNTIL GET
  640TIME=0
  650ENDPROC
  660DEFPROCenter
  670CLS
  680FOR Y=0 TO 20
  690PRINTTAB(0,Y);G$;
  700PRINTTAB(35,Y);Y+1;
  710NEXT
  720PRINTTAB(0,21);R$;PRINTTAB
(0,22);R$
  730PRINTTAB(1,21)"USE CAPITAL
LETTERS ONLY"
  740PRINTTAB(1,22)"PRESS 'DELETE'
IF YOU MAKE A MISTAKE"
  750X=0:Y=0
  760REPEAT
  770PRINTTAB(X+2,Y);S$
  780A$(X,Y)=GET$
  790AS=ASC(A$(X,Y))
  800IF AS=13 AND X<31 THEN REPEAT:
PRINTTAB(X+2,Y);" ";A$(X,Y)=" ":X=X+1:
```

Continued on page 49

®and TM designated trademarks of Sega Enterprises Inc.
© 1983 Sega Enterprises Inc.

# The Official

# FROGGER™

by SEGA®

## The popular arcade game for the DRAGON 32

SAFELY MANOEUVRE THE FROG TO ITS HOME WITHIN THE TIME GIVEN. CROSS THE HIGHWAY WITHOUT GETTING RUN OVER AND CROSS THE RIVER WITHOUT FALLING IN. AVOID TRAFFIC, SNAKES, CROCODILES AND DIVING TURTLES.

FOR 1 TO 2 PLAYERS. JOYSTICKS OPTIONAL

**On Cassette £8** each (including VAT & Postage)

AVAILABLE FROM DRAGON 32 DEALERS NATIONWIDE OR ORDER DIRECT FROM

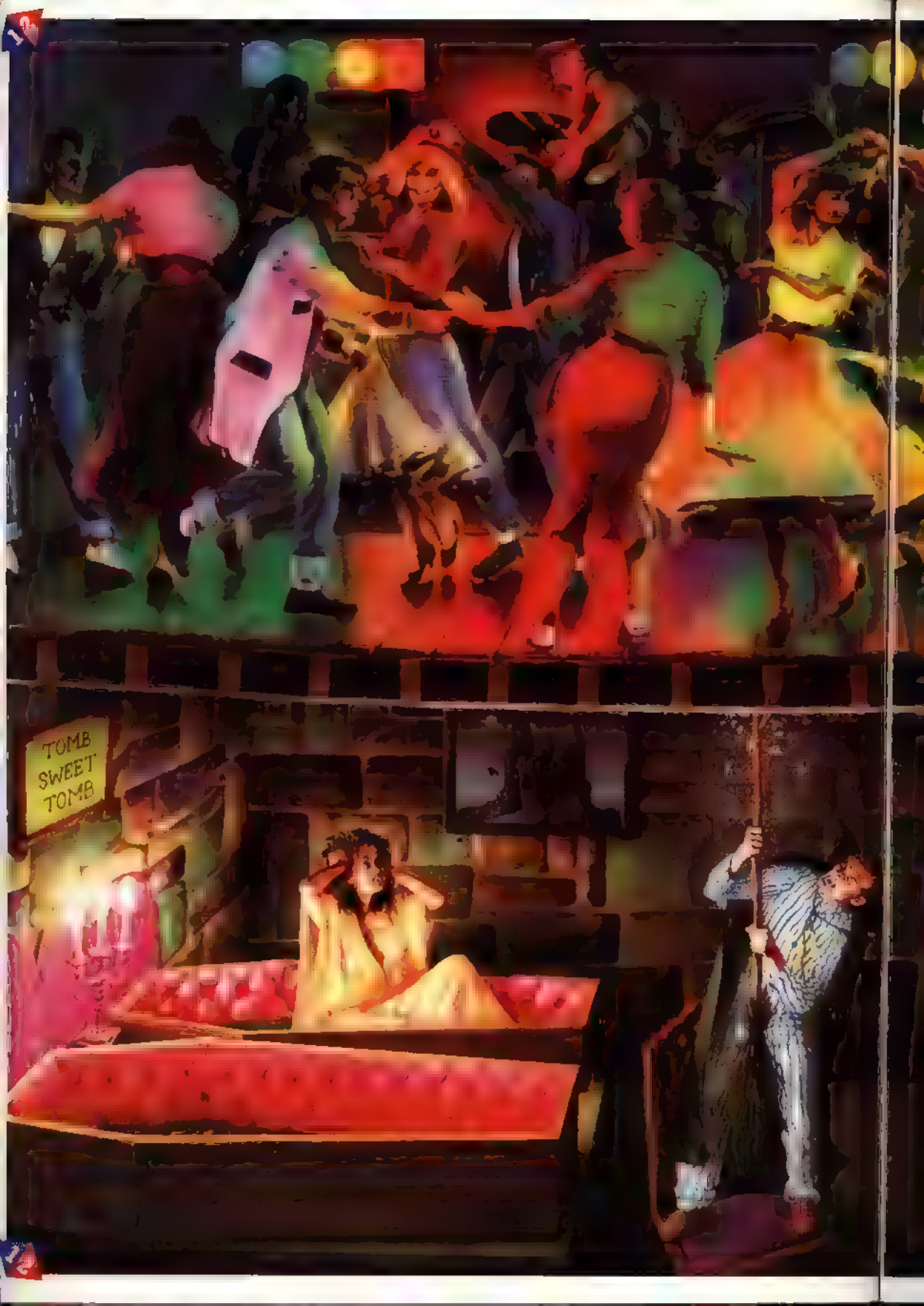
GUARANTEED 24 HOUR DESPATCH MICRODEAL (0726) 3456

# MICRODEAL

Dept. 41 TRURO ROAD, ST. AUSTELL CORNWALL PL25 5JE TEL:0726 3456

DISTRIBUTED ON BEHALF OF THE CORNSOFT GROUP

AVAILABLE FROM SELECTED Boots and John Menzies STORES


TOMB
SWEET
TOMB

# Once you've got to grips with the Rock 'n' Roll game, flip-over and get your teeth into Dracula.

**New K-tel Doublesiders are great fun and great value which ever way round you look at them.**

**For only £6.95 you don't just get one top quality computer game, you get two.**

**When you've finished playing one side simply flip it over (just like a music cassette) and move off on a second totally different, equally gripping game.**

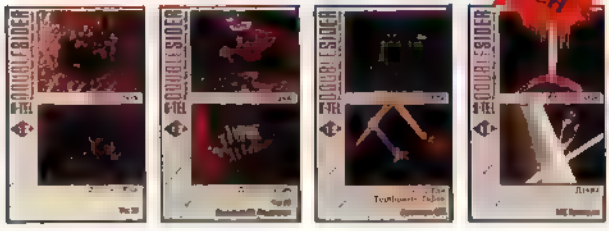
**Take your choice. Already there are five Doublesiders to choose from — three suitable for the ZX Spectrum and two for the Commodore Vic 20 — and there are more to come.**

**So hurry to the shops now and see for yourself how K-tel Doublesiders really do give you twice the fun with two on one.**

**1 It's Only Rock 'n' Roll** Can you become a superstar? A Rock 'n' Roll idol...Or are you just another has been?
You've got a lot of energy, a bit of money and a great future. But can you stay the course, stand the heartbreaking disappointments, fraud, scandal, even arrest? Can you capture the hearts and wallets of the public and become a Rock 'n' Roll idol?

**2 Tomb Of Dracula** Darkness is falling...The vampires are hungry...You can't go back...Your only chance of survival lies ahead.
The walls are cold and clammy. With each step you remember the horrors ahead; ghouls, zombies and pits of choking slime. In your hand you have but seven silver stakes with which to defend yourself...Dare you face the ultimate evil...and win.

K-TEL DOUBLESIDERS




**Twice the fun with two on one.**

# "ADVENTURES INT

## AVAILABLE FROM W.H. SMI TH

AND ALL LEADING CO

### Transylvanian Tower

A spine chilling adventure... enter via the dungeons... navigate your way through 500 3-D rooms... survive the swooping vampire bats ...reach the terrifying top... confront and kill Count Kreepie, ridding the world of this Transylvanian Terror.

Can you survive the Top of the Tower? Full save routine for use during the hours of darkness! 48K Spectrum **£6.50**

### Super Spy

Locate the secret island hideaway of the mysterious megiomaniac Dr. Death. Follow his trail across continents, through complex puzzles and 3-D mazes. Discover the entrance to his underground lair — but beware — even with your death-defying gadgets his evil henchmen may still win the day!

With save routine for part time secret agents! 48K Spectrum **£6.50**

**DEALERS — GENEROUS DISCOUNTS AVAILABLE CONTACT**

## RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

**CREDIT CARD HO**
**RING (062 86) 63**
**FOR EXPRESS SER**

All programs are sold subject to the condition that they may not, by way of trade or otherwise, be lent, hired out, re

# NTO IMAGINATION"

**MITH, JOHN MENZIES, BOOTS***

**NG COMPUTER STORES**

**Invincible Island**
**by Peter Cooke**

Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom? Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular split screen graphic and text adventure to braintease you for weeks!

Adventurous graphics for every location. Save routine. 48K Spectrum **£6.50.**

**Everest Ascent**

Stake your claim to the top of the world in this strategic vertical adventure. Conquer the summit of the world's highest peak! . . . struggle from base camp to base camp . . . survive the elements . . . watch out for avalanches, thin ice and wayward sherpas . . . encounter abominable snowmen and cross bottomless crevasses!

A game of skill, strategy and planning — a graphic simulation of man's ultimate endeavour! Save routine. 48K Spectrum **£6.50.**

**NTACT JOHN SALTHOUSE ON (06286) 63531 FOR DETAILS**

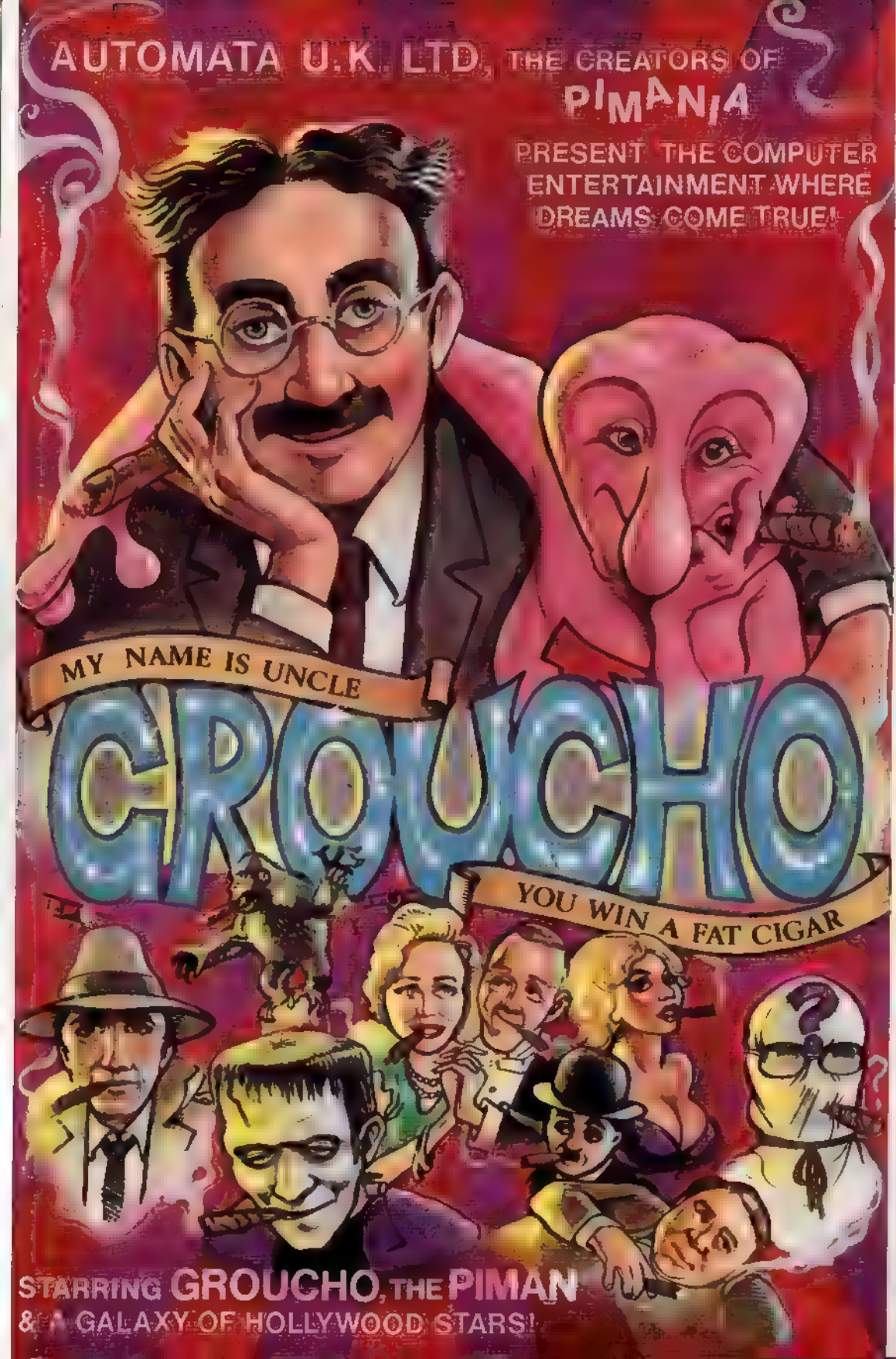
**CARD HOTLINE**
**(06286) 63531**
**PRESS SERVICE**

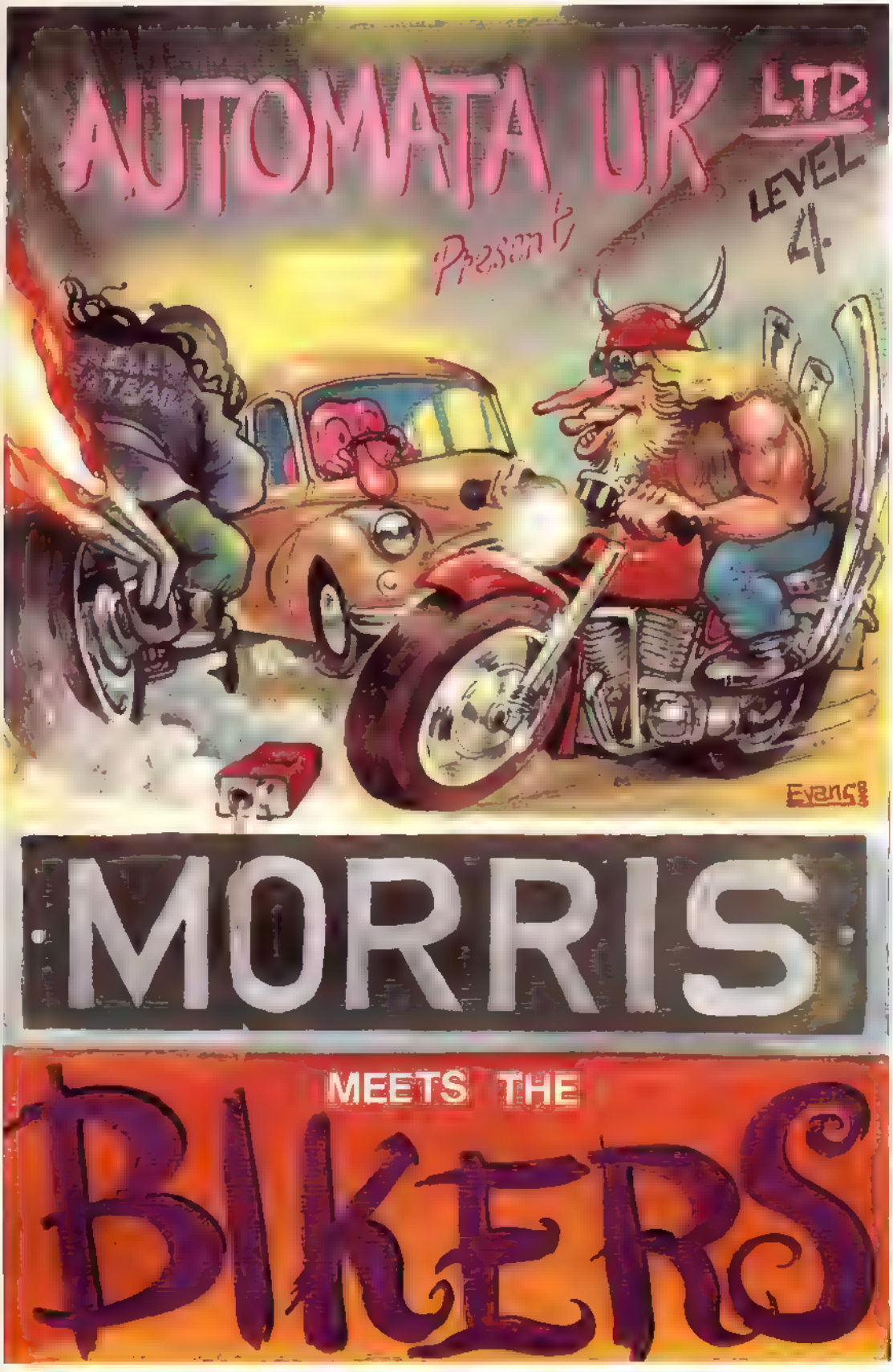
# RICHARD SHEPHERD SOFTWARE

**ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.**

nt, hired out, resold or otherwise circulated without the written permission of Richard Shepherd Software Ltd

Selected titles available in larger branches


AUTOMATA U.K. LTD. THE CREATORS OF PIMANIA
PRESENT THE COMPUTER ENTERTAINMENT WHERE DREAMS COME TRUE!
MY NAME IS UNCLE
GROUCHO
YOU WIN A FAT CIGAR
STARRING GROUCHO, THE PIMAN
& A GALAXY OF HOLLYWOOD STARS!


AUTOMATA UK LTD.
Presents
LEVEL 4
MORRIS
MEETS THE
BIKERS

# More than fun and games!

## FIRST STEPS with the Mr. Men

by Primer Educational Software

The ever-popular Mr. Men help prepare young children for reading with four simple and absorbing games designed to exercise essential skills as well as entertain.

An easy-to-use, colour-coded key guide is included with an illustrated introductory book, featuring the Mr. Men. For ages 4 to 8 years. Available now on cassette for the BBC [illegible] (Spectrum 48K and Electron versions coming shortly.) **£8.95**

## QUICK THINKING!

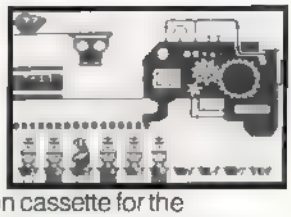
by Widgit Software

Two mind-stretching, space-age games to test mental arithmetic and nimble fingers.

In **Sum Vaders** alien robots invade the earth. Only quick thinking and fast reactions can prevent them. Several levels of difficulty and a two-player game with [illegible] handicap option make Sum Vaders equally testing for all family members, from [illegible] years to adult.

**Robot Tables** challenges the young player to make a series of perfect robots.

Knowing your multiplication tables is the key to controlling the robot-making machine. With a learning mode and a testing mode, Robot Tables is a fun way for early learners, and more advanced children, to master an important and often neglected skill.



Available now on cassette for the Spectrum 48K and Commodore 64 (BBC B and Electron versions coming shortly). **£6.95**

## CÆSAR THE CAT

by Andromeda Software

Meet Caesar, a cheeky young cat on duty in a well-stocked larder. He's kept busy chasing [illegible] gang of hungry mice eating the family's food. Playing against the clock, you guide Caesar along crowded shelves to pounce on the mice.

A fast, colourful, all-action, arcade-style game with catchy music and a best-score record. Challenging for high-scoring arcade addicts as well as great fun to play for the novice.

Available on cassette for the Commodore 64 **£8.95**

*Prices include VAT and post and packaging.*
*MIRRORSOFT programs are available from selected branches of W.H. Smith and Boots, and other leading software stockists.*
*Trade enquiries welcome: phone 01-822 3580.*

MIRRORSOFT

**SOFTWARE FOR ALL THE FAMILY**

To MIRRORSOFT, PO Box 50, Bromley, Kent, BR2 9TT

Please send me the following (enter number required in the space provided)

| | Price | Spectrum 48K (01) | BBC B (02) | Commodore 64 (05) |
|---|---|---|---|---|
| First Steps with the Mr. Men (MM01) | [illegible] 95 | | | |
| Quick Thinking* (QT01) | £6.95 | | | |
| Caesar the Cat (CC01) | £8.95 | | | |

I enclose a cheque/PO for £ made payable to "Readers' Account: Mirror Group Newspapers Ltd".

I understand that my remittance will be held on my behalf in the bank account named above until the goods are despatched.

Or please debit my ACCESS/BARCLAYCARD for the sum of £

card no.

Signature

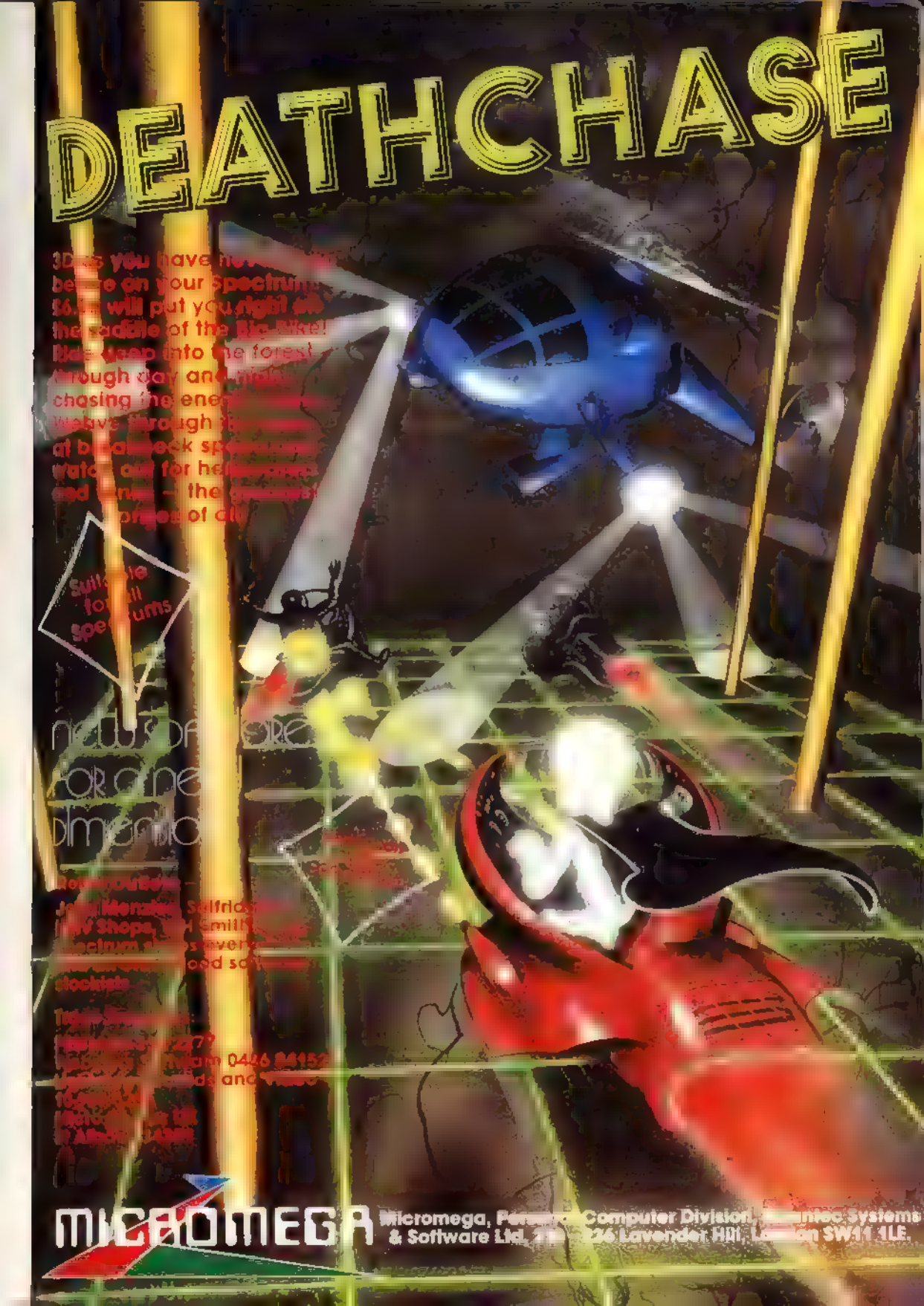
Name

Address

Postcode

PC 4

Offer applies to Great Britain and Eire only. Please allow 28 days for delivery. *MIRRORSOFT is a registered trade mark of Mirror Group Newspapers Ltd. Reg No. [illegible] Reg. Office: Holborn Circus, London EC1


DEATHCHASE
MICROMEGA

**Special Christmas offer**
order two complete sets and pay only £59.90

# More

fun & games from your Spectrum
with the intelligent interface+program+joystick
and for only **£34.90**

**Interface:** * for Spectrum * 1k on board memory * own rear edge connector – for printers etc * compatible with ALL standard joysticks **Joystick:** * self centring * 8 directional microswitched action * 2 independent fire buttons **Tape:** * easy to use program, the interface WORKS ON ALL SOFTWARE * keeps a record of all your games – so you only need to tell it about each game once!

CAMBRIDGE COMPUTING

Cambridge Computing
1 Benson Street Cambridge CB4 3QJ
Telephone 0223 322905

To Cambridge Computing
1 Benson Street, Cambridge CB4 3QJ
Telephone 0223 322905

Name_____

Address_____

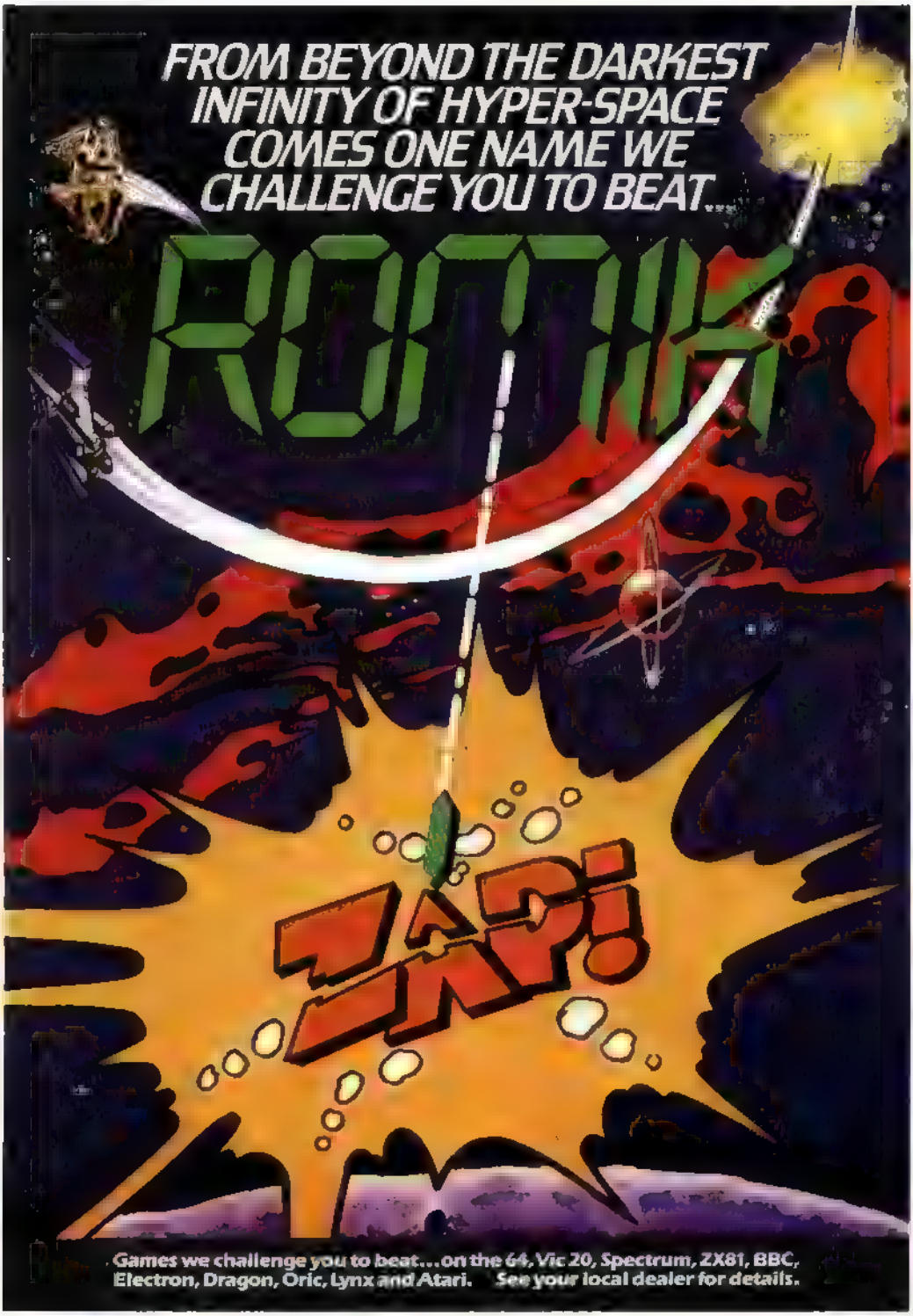
_____

Please send me
Joystick, Interface and Tape at £34.90☐ - Interface and Tape at £27.90☐
- Joystick only at £7.90☐ For Spectrum

I enclose cheque postal order * for £ made payable to Cambridge Computing
* delete as necessary

PCW

LUNA CRABS
By M.J. ESTCOURT
HAUNTED HEDGES
By DEREK BREWSTER
DEATH CHASE
By M.J. ESTCOURT
MICROMEGA
For any Spectrum
Trade Enqdires
PRISM 01 253 2277
WEBSTERS SOFTWARE
LIGHTNING RECORDS AND
MICRO DEALER
STARCLASH
By DEREK BREWSTER
NEW SOFTWARE FOR A NEW DIMENSION
Software Ltd 230 Lavender Hill London SW11 1LE


FROM BEYOND THE DARKEST
INFINITY OF HYPER-SPACE
COMES ONE NAME WE
CHALLENGE YOU TO BEAT...
ROBOTRON
ZAP!
ZAP!
Games we challenge you to beat...on the 64, Vic 20, Spectrum, ZX81, BBC,
Electron, Dragon, Oric, Lynx and Atari. See your local dealer for details.

```
UNTIL X=32:X=31
  810IF A$=127 THEN PRINTTAB(X+2,Y);
" ";:A$(X,Y)="":X=X-1:IF X<0 THEN
X=31:Y=Y-1
  820PRINTTAB(X+2,Y);A$(X,Y)
  830IF A$<>127 THEN X=X+1
  840IF X=32 THEN PRINTTAB(X+2,Y)"
";:X=0:Y=Y+1
  850UNTILY=21
  860*FX15,1
  870ENDPROC
  880DEFPROCpunc
  890CLS
  900FOR Y=0 TO 20
  910PRINTTAB(0,Y);C$;
  920NEXT
  930FOR Y=0 TO 20
  940FOR X=0 TO 31
  950IF ASC(A$(X,Y))<65 THEN
B$(X,Y)=A$(X,Y)
  960IF ASC(A$(X,Y))>=65 THEN B$(X,Y)=S$
  970PRINTTAB(X+2,Y);B$(X,Y)
  980NEXT
  990NEXT
 1000ENDPROC
 1010DEFPROCmove
 1020*FX15,1
 1030*FX4,1
 1040PRINTTAB(X1%+2,Y1%);"£"
 1050A=GET
 1060IF A=13 THEN PROCinstructions
 1070IF A=33 THEN PROClist
 1080PRINTTAB(X1%+2,Y1%);B$(X1%,Y1%)
 1090IF A=49 THEN PROClist
 1100IF A=136 THEN X1%=X1%-1
 1110IF A=137 THEN X1%=X1%+1
 1120IF A=138 THEN Y1%=Y1%+1
 1130IF A=139 THEN Y1%=Y1%-1
 1140IF X1%<0 THEN X1%=31:Y1%=Y1%-1
 1150IF X1%>31 THEN X1%=0:Y1%=Y1%+1
 1160IF Y1%<0 THEN Y1%=0
 1170IF Y1%>20 THEN Y1%=20
 1180PRINTTAB(X1%+2,Y1%);B$(X1%,Y1%)
 1190ENDPROC
 1200DEFPROCguess
 1210T=T+1:IF T/15=INT(T/15)
THEN PROCtele
 1220G$=CHR$(A)
 1230IF A>135 AND A<140 THEN ENDPROC
 1240PRINTTAB(X1%+2,Y1%);G$
 1250ENDPROC
 1260ENDPROC
 1270DEFPROCcheck
 1280IF A>135 AND A<140 THEN ENDPROC
 1290IF A=13 THEN ENDPROC
 1300IF G$<>A$(X1%,Y1%) THEN
PRINTTAB(0,23)"WRONG":FOR H=20 TO 0
STEP -1:SOUND 1
,-10,H,1:NEXT:ENDPROC
 1310B$(X1%,Y1%)=G$
 1320X1%=X1%+1:IF X1%>31 THEN X1%=0:
Y1%=Y1%+1:IF Y1%>20 THEN Y1%=0
 1330IF B$(X1%,Y1%)<>S$ THEN 1320
 1340ENDPROC
 1350DEFPROCluck
 1360FOR X%=0 TO 31
 1370FOR Y%=0 TO 20
 1380IF A$(X%,Y%)=G$ THEN PRINTTAB
(X%+2,Y%);G$:B$(X%,Y%)=A$(X%,Y%)
 1390NEXT
 1400NEXT
 1410ENDPROC
 1420DEFPROCtele
 1430CLS
 1440PRINT"What do you think this
is about?"
 1450PRINT"Type your ideas below, but
don't use    more than two lines."
 1460PRINT"Press Return when you
have finished"
 1470PRINT:PRINT:PRINT
 1480INPUTT$(Q):Q=Q+1
 1490CLS
 1500FOR Y=0 TO 20
 1510PRINTTAB(0,Y);C$
 1520NEXT
 1530FOR X%=0 TO 31
 1540FOR Y%=0 TO 20
 1550PRINTTAB(X%+2,Y%);B$(X%,Y%)
 1560NEXT
 1570NEXT
 1580ENDPROC
 1590DEFPROCinstructions
 1600CLS
 1610PRINTCHR$141+"INSTRUCTIONS"
 1620PRINTCHR$141+"INSTRUCTIONS"
 1630PRINT:PRINT:PRINT
 1640PRINT"The '£' will move to the
next space on  its own"
 1650PRINT"If you do not want to make
a guess thereuse the arrow keys to
move the '£'      around the screen"
 1660PRINT"When the '£' is in position,
 type in    your guess"
 1670PRINT"When you have finished the
whole story, press";CHR$(129);"red
key 9"
 1680PRINT"This will list your
messages"
 1690PRINT:PRINT
 1700PRINT"If there is anything
else which you do  not understand,
ask your teacher"
 1710REPEAT
 1720PRINTTAB(0,23)"PRESS SPACE BAR
TO CONTINUE"
 1730UNTIL GET
 1740CLS
 1750*FX15,1
 1760FOR X=0 TO 31
 1770FOR Y=0 TO 20
 1780PRINTTAB(0,Y);C$
 1790PRINTTAB(X+2,Y);B$(X,Y)
 1800NEXT
 1810NEXT
 1820ENDPROC
 1830DEFPROClist
 1840CLS
 1850PRINT
 1860PRINT"Your guesses were:-"
 1870FOR L=0 TO Q
 1880PRINTT$(L)
 1890NEXT
 1900PRINT"Time taken ";(TIME DIV
6000)MOD 60;" minutes"
 1910END
```

# DYNAMIC GAMES FOR YOUR TI 99/4A

A GREAT BOOK OF 29 GAMES TO HELP YOU MAKE THE MOST OF YOUR TI 99/4A

Now you can turn your TI 99/4A into a great games machine, and make it perform just as you hoped it would when you first bought it. The games in this 160-page book include: MISSION VENUS; SUBMARINE COMMANDER; CHECKERS; ALIEN ENCOUNTER; ASTORNIA; AIR RAID; REVERSI/OTHELLO; SPACE SURVIVAL; LIFE; SPACE RACE and STAR PATROL. **DYNAMIC GAMES FOR YOUR TI 99/4A** was written by 17-year-old Scott Vincent, one of the UK's most outstanding young games programmers.

The book is available from book and computer stores . . . or order direct from us.

Interface Publications, Dept. PC,
44-46 Earls Court Road, London W8 6EJ. INTERFACE PUBLICATIONS

Please send me a copy of
DYNAMIC GAMES FOR YOUR TI 99/4A. I enclose £4.95.

Name _____

Address _____

_____

_____

Computer and book trade supplied by The Computer Bookshop
[illegible]

# NOW 2ND GREAT YEAR! HIRE ZX81/SPECTRUM PROGRAM TAPES

JOIN OVER 2,000 DELIGHTED MEMBERS!

ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/c COMPILERS
EDUCATIONAL
AND MORE!

FREE! ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS PLUS OUR TOP 40 TAPES CHART BASED ON THOUSANDS OF SCORES!

UP TO 2 WEEKS FROM ONLY 64p + P/P & VAT!

CHOOSE FROM TAPES BY 40 TOP SUPPLIERS ALL WITH AGREEMENTS!

YOUR FIRST TAPE FREE BY RETURN IF YOU JOIN WITHOUT DELAY USING THIS SPECIAL COUPON!

THE ORIGINAL SINCLAIR LIBRARY!

To: SINCLAIR OWNERS' SOFTWARE LIBRARY, Warren Road, Liss, Hants GU33 7DD

NAME

ADDRESS

MACHINE:

MAIN INTEREST (for free tape)

Enclose £9.50 for year's membership (Spectrum) or £7.50 (ZX81). Overseas (Europe only) add £2 unless with a local branch as below:

Branches: Aldermaston, Nr. RG7 4QW. Basingstoke, Hants RG21 3DP. Bath, Somerset BA1 2QA. Bexhill, Sussex TN39 3LG. Birmingham, Nr. B29 6BD. Bristol, Avon BS99 7NH. Cambridge, CB4 4WX. Chester, CH1 2LF. Colchester, Essex CO3 3LL. Dublin, Eire (Code 01) 724911. Glasgow, G1 2QX. Leeds, LS1 6AN. Liverpool, L1 9DF. London, SW11 3JS. Manchester, M1 5PG. Newport, Gwent NP9 4GR. Norwich, NR3 1DD. Nottingham, NG1 5FH. Reading, Berks RG1 1LG. Sheffield, S1 2GA. Southampton, SO1 0HX. Stockport, Cheshire SK1 3AR. Swansea, SA1 1PF. Taunton, Somerset TA1 3DZ. Wolverhampton, WV1 4LG. Overseas: Belgium, Interlang, Rue Fossé aux Loups 44 & 46, B-2000 Bruxelles. Denmark, Lyngsoe Data A/S, Lundtoftevej 1C, DK-2800 Lyngby. Holland, Outlet Computer Software, Postbus 6578, 3502 JT Utrecht. Ireland, Software Hire, 43 Ashington Park, Templeogue, Dublin 6. Switzerland, Interlang, Postfach 1762, CH-8027 Zürich.

# TWICKENHAM COMPUTER CENTRE LTD

ACORN Commodore Apple

Buy the BEST BRITISH COMPUTER

BBC Model A £299
BBC Model B £399

Wordwise Word Processor
Software – Acorn, Bugbyte, Computer Concepts
Acornsoft on Disk • Digitiser Graphics Plotter
Joysticks for the BBC • 100K Single Disk Drives
BBC 800K Twin Disk Drives
Torch 800K Twin Disk Drives with CPM

ALL PRICES EXCLUDE VAT

Another British best!
Ceedata 8200 Word Processor FROM £1,995

Commodore 64: £229 • Apple IIE 64K on special offer – phone for latest price

Now in stock: Acorn Electron £199

ACORNSOFT Software for the BBC
Arcadians
Algebra: Manipulation Pack
Sliding Block Puzzles
Creative Graphics Cassette
Cube Master
Graphs & Charts Cassette
Chess
Desk Diary
£8.95 EACH
Philosopher's Quest
Books for the BBC:
Sphinx Adventure
Creative Graphics
Monsters
Graphs & Charts
Snapper
LISP on the BBC
Planetoid
FORTH on the BBC
£7.00 EACH

Babyboard Printer for BBC (complete with interface) £300
Star SG10 Dot Matrix Printer
Star SG15 Dot Matrix Printer
Brother Babyboard Printer
Juki Babyboard Printer
Black & White TV with Monitor conversion 12" or 14": £55
Cassette Deck (BBC compatible): £30

Acorn/BBC Main Distributors – Trade Enquiries Welcome

Twickenham Computer Centre
72 Heath Rd Twickenham Middx TW1 4BW (Tel: 01-891 4981)

Dealer's acts in confidence on Security

See us at the Wembley Xmas Fair 15-18 Dec Stand V36

# WIN THE POOLS?

## SPECTADRAW 2 — THE BEST SELLING POOLS PREDICTION PROGRAM FOR THE 48K ZX SPECTRUM

The program looks at the recent form of the teams playing in each week's English and Scottish football league matches and then refers to a large database to see what has happened in the past when teams with similar form met. By combining the lessons learnt from the past with the teams' current league position, the program generates a draw probability factor for each match. It can then identify the matches which are likely to yield draws and output suitable predictions. It will also output the least likely draws for the benefit of those who prefer the fixed odds lines on coupons.

**Program, 8000 match database (both on high quality cassette) and instruction manual £12.95 inclusive.**

## NEW!!! SPECTASORT — THE PERM GENERATION PROGRAM

Spectasort takes the 14 most likely and 10 least likely draw predictions and produces ten 8 from 10 full over perms, enabling you to complete your pools coupon directly from the screen. The program will run on its own in 16K, using your own predictions, or has the unique feature of being able to merge with SPECTADRAW 2 to provide a complete Pools Prediction package!!

**Spectasort program on high quality cassette £4.95 inclusive.**

*(Chequest/POs payable to B.S. McAlley)*

## SPECTADRAW

1 Cowleaze, Chinnor, Oxford OX9 4TD

SUNSHINE

# The best books for the Commodore 64

**The Working Commodore 64**
A library of practical subroutines and programs.
*"The style is easy to follow and informative" — Personal Comp. News August 18th 1983*
ISBN 0 946408 02 5

**Commodore 64 Machine Code Master**
A library of machine code routines *"At last a truly useful book for the machine code programmer — and it's easy to read as well" Popular Comp. News 25 August 1983*
ISBN 0 946408 05 x

**Commodore 64 Adventures**
A blueprint for the construction and playing of Adventure programs based on a full text Adventure.
ISBN 0 946408 17 4

**Graphic Art for the Commodore 64**
How graphics facilities can be fully developed by using Turtle Graphics techniques
ISBN 0 946408 15 7

**Business Applications for the Commodore 64**
Learn how to write your own packages
ISBN 0 946408 12 2

**Mathematics on the Commodore 64**
Mathematical routines for use in programs
ISBN 0 947408 14 9

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores.
**Dealer Enquiries:** 01-437 4343

Please send me
☐ The Working Commodore 64 at £5.95 each
☐ Commodore 64 Machine Code Master at £6.95 each
☐ Commodore 64 Adventures at £5.95 each
☐ Graphic Art for the Commodore 64 at £5.95 each
☐ Business Applications at £5.95 each
☐ Mathematics on the Commodore 64 at £5.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books: 12/13 Little Newport St., London WC2R 3LD
Or telephone Access Mastercard on 01-437 4343

Name _____
Address _____
_____
Signature _____
We can normally deliver in 4/5 days.

SECURI TAPE

# A MUST FOR ALL COMMODORE 64 OWNERS!!

- SECURES ALL YOUR GAMES AND UTILITIES ON SEPARATE TAPES, SAVES YOU POUNDS ON REPLACEMENTS.
- COPIES ALMOST ALL YOUR COMMODORE 64 TAPES.
- NO RISK TO ORIGINAL TAPES.
- SOME ALLOWANCE FOR LOAD ERRORS, COPY MAY LOAD AND RUN BETTER THAN THE ORIGINAL.
- FULL INSTRUCTION SET ON SCREEN WITH STEP BY STEP GUIDE.
- COST EFFECTIVE AT **£10.99.**

ALL ORDERS PLACED BEFORE 24.12.83 WILL RECEIVE 3 FREE C15 CASSETTES

SEND CHEQUE OR P.O. FOR £10.99 PAYABLE TO MOS CONSULTANTS

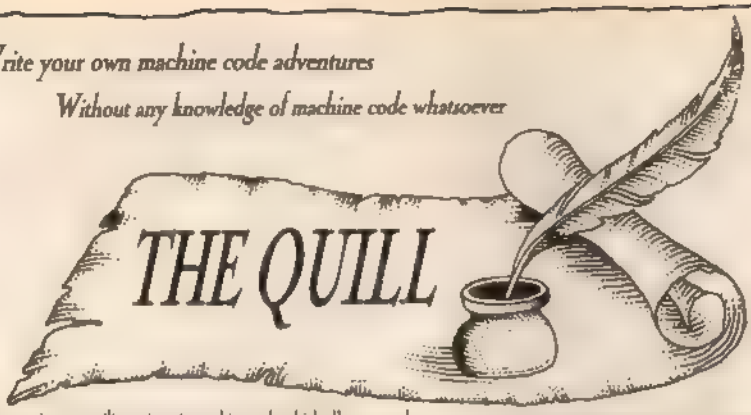
ORDER FROM MOS CONSULTANTS, 434 CORN EXCHANGE, HANGING DITCH, MANCHESTER M4 3EY

Name _____
Address _____
_____
Tel _____

**WARNING** IT IS AN OFFENCE TO USE THIS PROGRAM TO PROCESS COPYRIGHT MATERIAL FOR SALE, HIRE OR DISTRIBUTION

*Write your own machine code adventures*

*Without any knowledge of machine code whatsoever*




*THE QUILL* is a major new utility written in machine code which allows even the novice programmer to produce high-speed machine code adventures of superior quality to many available at the moment without any knowledge of machine code whatsoever.

Using a menu selection system you may create well over 200 locations, describe them and connect routes between them. You may then fill them with objects and problems of your choice. Having tested your adventure you may alter and experiment with any section with the greatest of ease. A part formed adventure may be saved to tape for later completion. When you have done so *THE QUILL* will allow you to produce a copy of your adventure which will run independently of the main *QUILL* editor, so that you may give copies away to your friends.

*THE QUILL* is provided with a detailed tutorial manual which covers every aspect of its use in writing adventures. It is impossible to describe all the features of this amazing program in such a small space so we have produced a demonstration cassette which gives further information and an example of its use.

This demo-cassette is available at **£2.00**, and *THE QUILL* itself at **£14.95**.

**FOR THE 48K SPECTRUM AT £14.95**

*Our Software is now available from many computer shops nationwide, or direct from us by post or telephone.*

*SAE for full details of our range.*

**Dealer enquires welcome.**

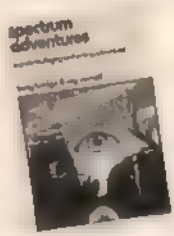
**GILSOFT**
30 Hawthorn Road
Barry
South Glamorgan
CF6 8LE
☎(0446) 736369

**TELEPHONE YOUR ORDER WITH**

ACCESS BARCLAYCARD VISA

# The best books for the Spectrum

SUNSHINE




**Spectrum Adventures**
A major work by Tony Bridge and Roy Carnell detailing the growth and development of Adventure Gaming.
ISBN: 0 946408 07 6

**The Working Spectrum**
A library of practical subroutines and programs by David Lawrence.
ISBN: 0 946408 00 9

**Spectrum Machine Code Applications**
David Laine explains a collection of practical machine code routines.
ISBN: 0 946408 17 3

**Sunshine Spectrum Software**
* Cruising — 16K RAM
* Blind Alley — 16K RAM
* Androids — 16K RAM
* Sword Fight — 16K RAM
* Galaxy Attack — 48K RAM

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores.

**Dealer enquiries:**
01-734 3454.

Please send me
- ☐ The Working Spectrum at £5.95 each
- ☐ Spectrum Adventures at £5.95 each
- ☐ Spectrum Machine Code Applications at £6.95 each
- ☐ Cruising at £4.95 each
- ☐ Blind Alley at £4.95 each
- ☐ Androids at £5.95 each
- ☐ Swordfight at £5.95 each
- ☐ Galaxy Attack at £5.95 each

I enclose a cheque/postal order for £_____ made payable to Sunshine Books,
12/13 Little Newport St.,
London WC2R 3LD

Name _____

Address _____

_____

_____

_____

Signature

_____

Or telephone Access Mastercard on 01-734 3454

# OPEN FORUM

***Open Forum*** **is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.**

## Bug Fever

### on Spectrum

In this game you control a frog on a lily pond surrounded by reeds. The aim of the game is to catch as many insects with the frog's sticky tongue as possible. You have 60 seconds in which to do this, four additional seconds are taken away if you jump into the pond. Scores vary depending on the type of insect you catch, ie, dragonflies, butterflies, or flies. Controls are:

5 — Skip left
8 — Skip right
6 — Jump left
7 — Jump right
■ — Release the frog's tongue.

When a game finishes the program goes into demo mode and you can press 'r' to re-start a new game. When keying in the listing, first run the user defined character part.

```
   1 DATA 14,17,17,35,37,42,116,
63,96,152,8,8,16,32,132,248,96,1
56,65,48,12,7,5,9,3,4,100,181,23
4,100,4,2,24,32,64,170,85,64,32,
24,0,0,192,62,61,255,62,32,0,127
,1,0,1,127,0,0,3,14,255,255,255,
14,3,0
   2 DATA 240,0,128,128,128,0,0,24
0,0,0,0,0,0,130,130,130,186,186,
254,124,124,56,56,56,56,186,60,6
8,68,68,68,68,0,34,34,34,34,34
,34,34,28,28,28,28,62,62,127,93,
93,65,65,65,0,0,0,112,216,124
,126,255,127,63,255
   3 DATA 14,27,62,126,255,254,2
52,255,248,0,126,255,126,0,248,0
,0,0,254,128,0,128,254,0,0,192,1
12,255,255,255,112,192,0,15,0,1,
4,1,0,15
   4 RESTORE : FOR q=0 TO 167 ST
EP 8: FOR r=0 TO 7: READ a: POKE
 USR "a"+q+r,a: NEXT r: NEXT q
  10 DATA BIN 10100010,BIN 010101
01,BIN 01010101,BIN 00101011,BIN
 00101011,BIN 10010111,BIN 10001
111,BIN 01111111,BIN 01100101,BI
N 01101010,BIN 10101010,BIN 1101
0100,BIN 11010100,BIN 11101001,B
IN 11100001,255
  15 DATA BIN 1010010,BIN 010101
■1,BIN 01010101,BIN 00101011,BIN
 00101011,BIN 10010111,BIN 10001
111,BIN 01111111,BIN 01100101,BI
N 01101010,BIN 10101010,BIN 1101
0100,BIN 11010100,BIN 11101001,B
IN 11100001,255
  20 DATA 14,17,17,35,37,42,116,
63,96,152,8,8,16,32,132,248
  900 BORDER 5: PAPER 8: BRIGHT 1
: CLS : FOR n=0 TO 10: PRINT AT
 n,0; PAPER 5;: NEXT n: FOR n=11
 TO 21: PRINT AT n,0; PAPER 1;:
 NEXT n
  901 INK 7: FOR r=0 TO 60 STEP 1
6: FOR q=0+RND*4 TO 255 STEP 16:
 PLOT q,r: DRAW 2,2: DRAW 2,-1:
NEXT q: NEXT r
  911 LET time=60: LET score=0
  912 INK 1: PAPER 4: PRINT AT 17
,3;"■
  913 PRINT AT 18,3;"
  914 PRINT AT 19,3;"
  915 INK 0: PAPER 4: PLOT 35,26:
 DRAW 170,0
  916 FOR n=45 TO 190 STEP 3: PLO
T n,26: DRAW 8,8: DRAW -8,-8: DR
AW 8,-8: NEXT n
  917 FOR n=0 TO 255: PLOT INK 4;
n,6: DRAW INK 4;0,INT (RND*8): ■
EXT n
  918 RESTORE 10: FOR n=0 TO 15:
READ a: POKE USR "a"+n,a: NEXT n
  919 PRINT AT 19,1; INK 3; PAPER
 1;"■";AT 18,3; INK 6; PAPER 1;
"■";AT 16,26; INK 7; PAPER 1;"■
";AT 19,28; INK 6; PAPER 1;"■"
  920 RESTORE 20: FOR n=0 TO 15:
READ a: POKE USR "a"+n,a: NEXT n
  930 FOR q=1 TO 0 STEP -.1: PLOT
 INK 6;224,175: DRAW INK 6;31,-q
*4,q: NEXT q
  940 OVER 0: FOR r=40 TO 200: FO
R q=1 TO 4: PLOT INK 3;r+q,16: D
RAW INK 3;0,12: NEXT q: LET r=r+
INT (10+RND*20): NEXT r
 1010 PAPER 8: INK 0: REM ■
 1015 PRINT AT 21,0; PAPER 4;"
 1016 PRINT AT 21,11; INK 7;"■■■P.
EVER"
 1020 LET x=16: LET y=13
 1021 PRINT AT x,y; INK 7;"■"
 1025 LET z=10
 1026 GO TO 5360
 5016 REM ■■■■■■■■■■■■■■■■■■■■
 5020 FOR n=x-3 TO x-z+(3 AND y>=
25 AND z>3) STEP -1: INK 0+(7 AN
D n>10): BRIGHT 1: PRINT AT n,y;
"■";AT n+1,y;"■";AT n+2,y;"■";AT
 n+3,y;" ": GO SUB 6050
 5030 NEXT n
 5035 PRINT AT n+1,y;" ";AT n+2,y
;" ";AT n+3,y;" "
 5040 FOR p=y TO y+4-(3 AND y>=25
)
 5050 PRINT AT n,p;" ■"
 5051 IF INKEY$="0" THEN BEEP .01
,0: PRINT AT n,p+3; INK 0;"■": A
 5052 IF (SCREEN$ (n,p+4)<>" ") A
ND INKEY$="0" THEN PRINT AT n,p+
3; INK 2;"■": FOR r=5 TO 1 STEP
-1: BEEP .01,-r: NEXT r: PRINT A
T a,b-1;" ": LET score=score+
sc1: GO SUB 5310
 5053 GO SUB 6050
 5060 NEXT p
 5061 LET time=time-(4 AND z<>3)-
(4 AND z=3)
 5065 PRINT AT n,p-1;"  "
 5070 FOR n=x-z+(3 AND y>=25 AND
z>3) TO x: INK 0+(7 AND n>10): P
RINT AT n-3,y+4;"■";AT n-2,y+4;"
■";AT n-1,y+4;"■";AT n-4,y+4;" "
: GO SUB 6050
 5080 NEXT n
 5085 PRINT AT n-4,y+4;" ";AT n-3
,y+4;" ";AT n-2,y+4;"
 5090 LET y=y+4: PRINT AT x,y; IN
K 7;"■"
 5095 BEEP .01,-20: BEEP .01,-10
 5096 IF y>=29 THEN LET time=time
-3: PRINT AT x,y; INK 1;" ": INK
 7: FOR n=1 TO 20: BEEP .003,n:
PLOT 236,32: GO SUB 6050: DRAW I
NT (-10+RND*20),INT (RND*15): NE
XT n: GO SUB 6050: FOR q=16 TO 1
8: PRINT AT q,28; PAPER 1;" "
 : GO SUB 9120: GO SUB 6050: NEXT
 q: LET x=16: LET y=13
 5100 RETURN
 5110 REM ■■■■■■■■■■■■■■■■■■■■
 5120 FOR n=x-3 TO x-z STEP -1: I
NK 0+(7 AND n>10): PRINT AT n,y;
"■";AT n+1,y;"■";AT n+2,y;"■";AT
 n+3,y;" ": GO SUB 6050
 5130 NEXT n
 5135 PRINT AT n+1,y;" ";AT n+2,y
;" ";AT n+3,y;" "
 5140 FOR p=y TO y-4 STEP -1
 5150 PRINT AT n,p;" ■": GO SUB
 6050: POKE USR "a"+4,4
 5156 IF INKEY$="0" THEN BEEP .01
,0: POKE USR "a"+4,255
 5157 IF (SCREEN$ (n,p-1)<>" ") A
ND INKEY$="0" THEN POKE USR "a"+
4,255: FOR r=5 TO 1 STEP -1: BEE
P .01,-r: NEXT r: PRINT AT a,b-1
;" ": LET score=score+sc1: G
: SUB 5310
 5160 NEXT p
 5161 LET time=time-(4 AND z<>3)-
(4 AND z=3)
 5165 PRINT AT n,p+1;"  "
 5170 FOR n=x-z TO x: INK 0+(7 AN
```

```
D n>10): PRINT AT n-3,y-4;"U";AT
 n-2,y-4;"▲";AT n-1,y-4;"n";AT n
-4,y-4;" ": GO SUB 6050
5180 NEXT n
5185 PRINT AT n-4,y-4;" ";AT n-3
,y-4;" ";AT n-2,y-4;" "
5190 LET y=y-4: PRINT AT x,y;"▶"
5195 BEEP .01,-20: BEEP .01,-10
5196 IF y<=3 THEN LET time=time-
3: PRINT AT x,y; INK 1;" ": INK
7: FOR n=1 TO 20: BEEP .003,n: P
LOT 11,32: GO SUB 6050: DRAW INT
 (-10+RND*20),INT (RND*10): NEXT
 n: GO SUB 6050: FOR q=16 TO 16:
 PRINT AT q,0; PAPER 1;" ": GO
 SUB 9110: GO SUB 6050: NEXT q:
LET x=16: LET y=13
5200 RETURN
5300 REM [redacted]
5310 LET a=INT (1+RND*7): LET b1
=INT (1+RND*3)
5320 IF b1=1 THEN LET a$="🦋 "
LET d=-1: LET d1=0: LET b=29: LE
T sc1=150
5330 IF b1=2 THEN LET a$="🦟 ":
LET d=-1: LET d1=0: LET b=29: LE
T sc1=200
5340 IF b1=3 THEN LET a$="🐀":
LET d=1: LET d1=29: LET b=0: LET
 sc1=50
5350 RETURN
5360 GO SUB 5310
6000 GO SUB 6050
6001 PRINT AT 21,0; INK 7;"TIME
 ";INT time AND time>=0;" ";AT 21
,22; INK 7;"SCORE:";score
6002 IF time<=[redacted] THEN LET time=0:
 PRINT AT 10,9; INK 7; PAPER 4;
   GAME-OVER  ": GO TO 9000
6005 IF INKEY$="8" THEN LET z=3:
 BEEP .01,8: GO SUB 5016
6010 IF INKEY$="7" THEN LET z=x-
3-1: BEEP .01,7: GO SUB 5016:
6020 IF INKEY$="5" AND y>1 THEN
LET z=3: BEEP .01,5: GO SUB 5120
:
6030 IF INKEY$="6" AND y>1 THEN
LET z=x-a-1: BEEP .01,5: GO SUB
5120:
6035 LET time=time-1/10
6040 GO TO 6000
6050 PRINT AT a,b; INK 0;a$
6060 LET b=b+d: IF b=d1 THEN PRI
NT AT a,b-1;" ": GO SUB 5310
6065 BEEP .001,b
6070 RETURN
9000 IF INKEY$<>"r" THEN GO TO 9
000
9015 PRINT AT 1,12;"SCORING";AT
2,12;"--------"
9020 PRINT AT 4,3;"🦟  DRAGONFLI
ES------ 200"
9040 PRINT AT 6,3;"🦋  BUTTERFLI
ES------ 150"
9070 PRINT AT 8,3;"🐀  FLIES----
-------- 50 "
9080 FOR n=1 TO 50: NEXT n
9090 IF INKEY$<>"r" THEN GO TO 9
090
9100 FOR n=1 TO 10: PRINT AT n,0
; PAPER 5; INK 7;"
                 ": NEXT n: PRI
NT AT 21,28; PAPER 4; INK 4;"
 ": PRINT AT x,y;" ": LET score=
0: LET z=10: LET x=16: LET y=13:
 LET time=61: PRINT AT x,y; INK
7;"▲": GO TO 5360
9110 INK 7: FOR n=0 TO 16 STEP 1
6: PLOT n,32: DRAW 2,1: DRAW 2,-
1: NEXT n: PRINT AT 16,13;"▟": R
ETURN
9120 INK 7: FOR n=0 TO 16 STEP 1
6: PLOT n+230,32: DRAW 2,1: DRAW
 2,-1: NEXT n: PRINT AT 16,13;"▟
": RETURN
```

**Bug Fever**
*by Simon Cox*

## Double Height

on Vic20

The program doubles the height of ■ the characters on an unexpanded Vic. Although short it can be very useful for display effects.

```
10 FOR I = 1 TO 1024
20 B = PEEK ( Y + 32768 )
30 POKE 5120 + X,B
40 POKE 5121 + X,B
50 X = X + 2 : Y = Y + 1
60 NEXT I
70 PRINT CHR$ (147)
80 POKE 36867,155
90 POKE 36869,253
```

**Double Height**
*by Julian Storer*

## Elements

### on BBC

This program should help to remind you of the main features of the first 20 elements.

**Program notes**

| | |
|---|---|
| 40 | Asks for Element |
| 60-100 | Reads and checks Data |
| 110-230 | Main section |
| 240-250 | Another run? |
| 260-480 | Data |

**Variables**

| | |
|---|---|
| A$ | Element |
| C | Atomic number |
| D | Atomic weight |
| E$ | Elements symbol |
| F$ | Electron arrangement |
| H | Number of electrons |
| I | Number of protons |
| G | The atomic group |

To return the copy keys back to their copy function type: 245 *FX4.

```
LIST
  10REM ELEMENTS REVISION
  20*FX4,4
  30MODE 7:VDU23;8202;0;0;0;
  40PRINT"ENTER ELEMENT TO BE REVISED"
  50
  60INPUT B$
  70READ A$,C,D,E$,F$,H,I,G
  80IF A$="Z" THEN 260
  90IF B$=A$ THEN 110
 100IF B$<>A$ THEN 70
 110PRINT"ELEMENT ";A$
 120PRINT"ATOMIC NUMBER ";C
 130PRINT"ATOMIC WEIGHT ";D
 140PRINT''"What is ";A$;"'s symbol ";
 150INPUT J$:IF J$<>E$ THEN PRINT"WRONG.ELEMENT ";A$;"'S SYMBOL
    IS ";E$:ELSE PRINT"CORRECT"
 160PRINT''"What is the electron arrangement(start  by ";CHR$(34);"
    and finish with ";CHR$(34);")"
 170INPUT J$:IF J$ <>F$ THEN PRINT"ELECTRON ARRANGEMENT:";F$:ELSE
    PRINT"CORRECT"
 180PRINT"How many neutrons in this element"
 190INPUT J:IF J=H THEN PRINT"CORRECT" ELSE PRINT"NO. OF
    neutrons=atomic weight -atomic number.Which is ";H
 200PRINT"How many protons in this element "
 210INPUT J:IF J=I THEN PRINT"CORRECT" ELSE PRINT"no. of
    protons=atomic number. Which is ";I
 220 PRINT"Which group is this element in?";
 230 INPUTJ:IF J=G THEN PRINT"CORRECT" ELSE PRINT"GROUP=no.
     of electrons on the outer shellof the atom"
240PRINT"ANOTHER ELEMENT";
250J$=GET$:IF J$="Y" THEN CLS:GOTO 40 ELSE END
260PRINT"ELEMENT IS NOT IN THE FIRST TWENTY     ELEMENTS."
270PRINT"PLEASE TRY AGAIN":FORO=1 TO 1000:NEXTO:RUN
280DATAHYDROGEN,1,1,H,"1",0,1,1
290DATAHELIUM,2,4,He,"2",2,2,2
300DATALITHIUM,3,7,Li,"2,1",4,3,1
310DATABERYLLIUM,4,9,Be,"2,2",5,4,2
320DATABORON,5,11,B,"2,3",6,5,3
330DATACARBON,6,12,C,"2,4",6,6,4
340DATANITROGEN,7,14,N,"2,5",7,7,5
350DATAOXYGEN,8,16,O,"2,6",8,8,6
360DATAFLUORINE,9,19,F,"2,7",10,9,7
370DATANEON,10,20,Ne,"2,8",10,10,8
380DATASODIUM,11,23,Na,"2,8,1",12,11,1
390DATAMAGNESIUM,12,24,Mg,"2,8,2",12,12,2
400DATAALUMINIUM,13,27,Al,"2,8,3",14,13,3
410DATASILICON,14,28,Si,"2,8,4",14,14,4
420DATAPHOSPHORUS,15,31,P,"2,8,5",16,15,5
430DATASULPHUR,16,32,S,"2,8,6",16,16,6
440DATACHLORINE,17,35.5,Cl,"2,8,7",16.5,17,7
450DATAARGON,18,36,Ar,"2,8,8",18,18,8
460DATAPOTTASIUM,19,39,K,"2,8,8,1",20,19,1
470DATACALCIUM,20,40,Ca,"2,8,8,2",20,20,2
480DATAZ,0,0,X,"0",0,0,0
```

**Elements**
*by Kenneth Adair*

## Arcade software for COMMODORE 64
## Action-packed 100% Machine Code

£8.95

Scale the ladders to get your Space Hamster but watch out for the homicidal "Meanies". the slightest touch and you'll be electrocuted. Once the Hamster is in your hands you can start to fill the world with the meanies chase them up and down the ladders, through the escape door, lure them into the holes dug with your space hammer. When you trap one, rush over and BONK him on the head. But HURRY! If you loiter he will climb out, fill in the hole, and then home in on you flashing in anger! To add to your problems your oxygen is running out and the meanies move faster the more you kill.

A superb arcade-style game with Hall of Fame. Uses one joystick.

£8.95

"There in the sky I saw the screaming alien birds. They had come to invade our planet. People ran in wild panic and desperation in some vain hope of escape. But there was no escape. The aliens swooped out of the sky killing anyone in their path. I alone decided to stay and fight, but then the eggs hatched and the true horror began.

A fast-moving Galaxian type arcade game with Hall of Fame and bonus lives. Uses one joystick.

**LATES RELEASE — AVAILABLE NOW! CYBERMEN — £8.95**

You, our hero, attempt to remove the platinum from the Cosmic space station invaded by the Cybermen. Programmed to destroy all intruders, their duty is to protect the precious metal. For safe keeping this has been distributed throughout the random maze of corridors in which the space station consists. Not only do the Cybermen home in on you but you will be electrocuted if you touch the maze walls. Your phaser will kill the Cybermen but the corridors are also patrolled by the indestructible overseer who possesses the unearthly power to moving through walls.

*All orders despatched by return first class post.*
*Callers and Trade enquiries welcome*
**Dept PCW 13, 2 Glenridale Street, Leeds LS9 9JJ**
**Telephone (0532) 480987**

**J. MORRISON (MICROS) LTD.**
*Suppliers of quality machine code software since 1978*



# TOWN NATHAN
## HOME COMPUTERS, SOFTWARE, BOARD GAMES, ROLE PLAYING GAMES AND BOOKS

## WEST YORKSHIRE'S LOCAL COMPUTER SHOPS

**MORLEY —** **DRAGON BYTE**
51a Queen Street
Morley
Leeds 25
Tel: 0532 522690

**HEADINGLEY —** **LAST CHANCE**
10 Ash Road
Headingley
Leeds 6
Tel: 0532 744235

**CROSSGATES —** **HIEROMANS DELL**
89 Panda's Way
Leeds 15
Tel: 0532 641855

We're worth a visit because:
- ★ We've probably the best range of software in the North — and we're improving all the time.
- ★ We've a growing range of computers, peripherals, upgrades and books.
- ★ We've the biggest range of Citadel figures for leagues around.
- ★ We've board and adventure games for all ages from TSR, Games Workshop, Avalon Hill, Victory Games, GDW, Yaquinto, etc, etc.

**PROGRAMMERS — Assassin Software needs your marketable programs. Give us a call.**



Shards SOFTWARE

# CHRISTMAS CATALOGUE

Shards SOFTW, RE

## NEW RELEASES

**JERICHO ROAD** (Spectrum 48K): Full featured educational adventure set in biblical times. Explore southern Israel, meeting people and visiting places from the pages of the Bible. Ideal family Christmas present. **£5.75.**

**HOOKED!** (Dragon 32): Entertaining graphical fishing game for 1 or 2 players. Suitable for all ages. Many levels of play, with optional joysticks. **£5.75.**

**MONSTER MATHS** (Dragon 32): Maths education for 8-14-year-olds. Menu driven, with five functions and nine levels of difficulty. **£6.95.**

**SCIENCE 1** (BBC B): Physics education for 11-16-year-olds. Covers, lenses, mirrors, balances, meters and thermometers. With full documentation. **£6.95.**

**EMPIRE** (BBC B): Exciting strategy game for all ages. With eight difficulty levels. Save the world from the evil Empire! **£6.95.**

## ALSO AVAILABLE

**DRAGON 32:** Pettigrew's Diary (£7.95). "I have nothing but praise for this unorthodox adventure". *Micro Adventurer*. Empire (£6.95). "An extremely good game . . . Highly recommended" *PCN* November 17, 1983. Quiz Pack (£3.95), Infant Pack (£3.95), Junior Pack (£3.95), Puzzler (£6.95), Family Programs (£6.95), Fun and Games (£6.95), Live and Learn (£6.95), City Defence (£5.75), Fun to Learn (£6.95).

**BBC B:** Fun to Learn (£6.95), Monster Maths (£6.95).

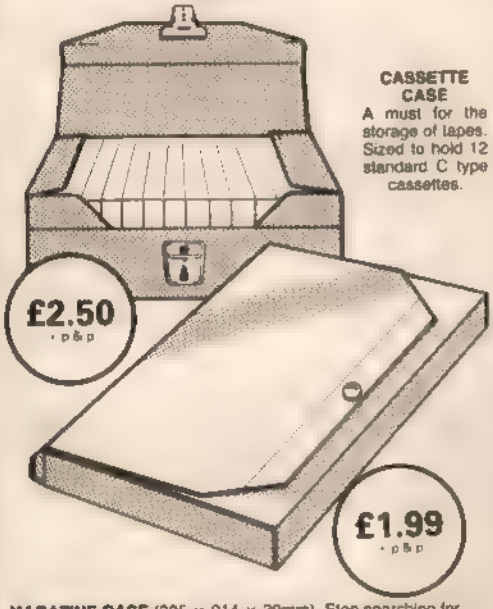
**LYNX:** Grid Attack (£4.95).

***SEE US AT THE WEMBLEY CHRISTMAS FAIR, December 15-18, STAND 259.***

AVAILABLE NOW FROM SELECTED BRANCHES OF BOOTS AND ALL GOOD STOCKISTS
or send cheque/PO to **SHARDS SOFTWARE, 189 ETON ROAD, ILFORD, ESSEX IG1 2UQ**

# PROTECT YOUR VALUABLE SOFTWARE MAGAZINES AND TAPES

*Designed specifically for the protection of valuable cassettes and magazines. Supplied in strong black plastic.*



**CASSETTE CASE**
A must for the storage of tapes. Sized to hold 12 standard C type cassettes.

**£2.50** + p&p

**£1.99** + p&p

**MAGAZINE CASE** (305 × 214 × 30mm). Stop searching for those lost articles! Holds most weekly and monthly computer magazines.

*Mail with cheque/postal order to:*

**SSS**
**61 Upgate, LOUTH**
**Lincolnshire LN11 9HD**

**PLEASE ALLOW 28 DAYS FOR DELIVERY**

| QUANTITY | ITEM | PRICE | TOTAL |
|---|---|---|---|
| | CASSETTE CASE | | |
| | MAGAZINE CASE | | |
| Add 30p P & P ITEM | | | |
| | | | |

*Dealer enquiries welcome. Export prices on application.

PLEASE PRINT CLEARLY

Name .....

Address .....

.....

.....

# Micromail

## LOW COST SOFTWARE

| DRAGON 32 Program Name | Supplier | Price inc VAT |
|---|---|---|
| Alcatraz | Microdeal | 8.00 |
| Backgammon | Microdeal | 8.00 |
| Cosmic Zap | Microdeal | 8.00 |
| Cuthbert Goes Walkabout | Microdeal | 8.00 |
| Defense | Microdeal | 8.00 |
| Dragon Invaders | Microdeal | 8.00 |
| Flipper | Microdeal | 8.00 |
| Frogger | Microdeal | 8.00 |
| Golf | Microdeal | 8.00 |
| Invaders Revenge | Microdeal | 8.00 |
| Jerusalem Adventure 2 | Microdeal | 8.00 |
| Katerpillar Attack | Microdeal | 8.00 |
| Mansion Adventure 1 | Microdeal | 8.00 |
| Monaco Grand Prix | Microdeal | 8.00 |
| Planet Invasion | Microdeal | 8.00 |
| Scarfman | Microdeal | 8.00 |
| Shuttle | Microdeal | 8.00 |
| Space War | Microdeal | 8.00 |
| Talking Android Attack | Microdeal | 8.00 |
| The King | Microdeal | 8.00 |
| Williamsburg Adventure | Microdeal | 8.00 |
| Ultimate Adventure 4 | Microdeal | 8.00 |

| COMMODORE 64 Program Name | Supplier | Price inc VAT |
|---|---|---|
| Sprite Graphics | Rabbit | 5.99 |
| Escape MCP | Rabbit | 5.99 |
| Pakacuda | Rabbit | 5.99 |
| Centipods | Rabbit | 5.99 |
| Cyclons | Rabbit | 5.99 |
| Monopolee | Rabbit | 5.99 |
| Annihilator | Rabbit | 5.99 |
| Paratroopers | Rabbit | 5.99 |
| Potty Painter | Rabbit | 5.99 |
| Lancer Lords | Rabbit | 5.99 |

| VIC20 Programme Name | Supplier | Model | Price inc VAT |
|---|---|---|---|
| Arcadia | Imagine | Unex | 5.50 |
| Wacky Waters | Imagine | Unex | 5.50 |
| Catcha Snatcha | Imagine | Unex | 5.50 |
| Frantic | Imagine | Unex | 5.50 |
| Skyhawk | Quicksilva | 3K | 7.95 |
| Tornado | Quicksilva | Unex | 5.95 |
| Harvester + Brainstorm | Quicksilva | Unex | 7.95 |
| Pixel Power | Quicksilva | 16K | 7.95 |
| Trader | Quicksilva | 16K | 14.95 |
| Subspace Striker + Zor | Quicksilva | 16K | 7.95 |
| Starquest + Encounter | Quicksilva | 16K | 7.95 |
| Paratroopers | Rabbit | Unex | 5.99 |
| Antimatter Splatter | Rabbit | Unex | 5.99 |
| The Catch | Rabbit | Unex | 5.99 |
| English Invaders | Rabbit | Unex | 5.99 |
| Pakacuda | Rabbit | Unex | 5.99 |
| Escape MCP | Rabbit | Unex | 5.99 |
| Critters | Rabbit | 8K | 5.99 |
| Cyclons | Rabbit | 8K | 5.99 |
| Race Fun | Rabbit | Unex | 5.99 |
| Skramble | Rabbit | Unex | 5.99 |
| Myriad | Rabbit | 8K | 5.99 |
| Quacxers | Rabbit | Unex | 5.99 |
| Atom Smasher | Romik | Unex | 5.99 |
| Martian Raider | Romik | Unex | 5.99 |
| Moons of Jupiter | Romik | 3K | 7.99 |
| Multisound Synthesiser | Romik | Unex | 8.99 |
| Shark Attack | Romik | Unex | 5.99 |
| Space Attack | Romik | Unex | 5.99 |
| Power Blaster | Romik | Unex | 5.99 |
| Time Destroyers | Romik | 3K | 6.99 |

| SPECTRUM Program Name | Supplier | Model | Price inc VAT |
|---|---|---|---|
| Arcadia | Imagine | 16K | 5.50 |
| Schizoids | Imagine | 16K | 5.50 |
| Ah Diddums | Imagine | 16K | 5.50 |
| Molar Maul | Imagine | 16K | 5.50 |
| Jumping Jack | Imagine | 16K | 5.50 |
| Zip Zap | Imagine | 48K | 5.50 |
| Zzoom | Imagine | 48K | 5.50 |
| Over the Spectrum 1 | Melbourne | 16K | 5.95 |
| Over the Spectrum 2 | Melbourne | 16K | 5.95 |
| Over the Spectrum 3 | Melbourne | 16K | 5.95 |
| Penetrator | Melbourne | 48K | 6.95 |
| The Hobbit + Book | Melbourne | 48K | 14.95 |
| Progs Frm Spec Mcn Lang | Melbourne | 16K | 5.95 |
| Terror Daktil 4D | Melbourne | 48K | 6.95 |
| Trader | Quicksilva | 48K | 9.95 |
| The Word Processor | Quicksilva | 48K | 5.95 |
| Mined-Out | Quicksilva | 48K | 4.95 |
| Timegate | Quicksilva | 48K | 6.95 |
| Easyspeak | Quicksilva | 48K | 4.95 |
| Astroblaster | Quicksilva | 16K | 4.95 |
| Frenzy | Quicksilva | 16K | 4.95 |
| Meteor Storm | Quicksilva | 16K | 4.95 |
| Space Intruders | Quicksilva | 16K | 4.95 |
| Aquaplane | Quicksilva | 48K | 6.95 |
| Xadom | Quicksilva | 48K | 6.95 |

**All the above items at 15% below list price until January 31, 1984.**

Cash with order
**MICROMAIL LTD, PO BOX 34 (DEPT PCW)**
**Leighton Buzzard LU7 8SJ**

**Barclaycard/Access accepted**

TNT SOFTWARE

# CENTIMUNCH

Special introduction offer
£5.95 (inc P&P and VAT)

**FOR THE 48K SPECTRUM**

**An original game with on-screen scoring plus Hi-Score. Watch out for the Spider, mind the Bees don't confuse. Remember eat all your veg, a Super Carrot can improve your eyesight — now you can see the gate. Careful round those Rocks. Can you survive a full 12 months in a garden like this?**

*DEALER ENQUIRIES WELCOME – RING 0229 27324*

**Please send Cheques or P/Os to:**

**T.N.T. Software, Dept B**
**Melton House, Lindal**
**Ulverston, Cumbria**

I ENCLOSE £.....

NAME .....

ADDRESS .....

.....

.....



# SUPERCODE
## —for 16K and 48K Spectrum

100+ ROUTINES

This is a superior machine code tool kit with one hundred machine code routines that are relocatable for use in your own BASIC and/or machine code programs, the combined user friendly BASIC program, 48k Spectrum only, gives easy access to all routines. ● Index of routines. ● Call up details of each routine including all information required to tailor the routine to your needs. ● Demonstration of how the routine works under software control, the demonstration is repeatable. ● Save and verify individual routines. ● Comprehensive user guide.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Block Memory Insert | 24 | Set Fn Character Set | 47 | Word Pee |
| 2 | Block Level Delete | 25 | Memory Available | 48 | Strings to Upper Case |
| 3 | Check Sum | 26 | Line Renumber | 49 | Strings to Lower Case |
| 4 | Check Renumber | 27 | Line Number Append Gen | 50 | Program to Upper Case |
| 5 | Super Renumber | 28 | Duplicate Detection | 51 | Program to Lower Case |
| 6 | 2 Byte Converter | 29 | Line Beep Simulator | 52 | Uppercase |
| 7 | Dec - Hex Converter | 30 | Mult Beep Simulator | 53 | Clarify |
| 8 | Hex - Dec Converter | 31 | Screen 2 | 54 | Screen Saver |
| 9 | Bytes to Compressed | 32 | Screen Store | 55 | Screen Compound |
| 10 | On Error Goto | 33 | Screen Exchange | 56 | Screen Invert |
| 11 | On Break Goto | 34 | Display 1 Program | 57 | Inverse Air |
| 12 | Free Scroller | 35 | Block Copy | 58 | Ink Change |
| 13 | Non Detectable Lines | 36 | Compact | 59 | Paper Change |
| 14 | Border Effects | 37 | Expand | 60 | Flash On |
| 15 | Screen Search | 38 | Expand Item | 61 | Flash Off |
| 16 | Variables Search List | 39 | Append | 62 | Bright On |
| 17 | 24 Line Printing | 40 | Insert Program | 63 | Bright Off |
| 18 | Sqz Data | 41 | Tape Header Reader | 64 | Screen Print |
| 19 | Flash Switch | 42 | Addresses | 65 | Rand - Number Generator |
| 20 | Bright Switch | 43 | Computer Detect | | |
| 21 | Paint Shade | 44 | Remove Routine | Requires 48K for 100 routines | |
| 22 | Keypad Sound | 45 | Display Memory | **SUPERCODE £9.95** | |
| 23 | Keyclay Sound | 46 | Trace Number | | |

Also available at Boots, W H Smith and all good computer shops
**DELIVERY:** Send SAE for Catalogue
**UK**—prices include VAT and postage & packing
**EUROPE**—add 80p per program
**ALL OTHER PLACES**—for air mail add £2 for the first program and 50p for each subsequent program. Surface delivery add 80p per program

Send Cheque, Postal Order or Access No. to
cpsoftware
**CP SOFTWARE, Dept PCW1A**
**17 Orchard Lane, Prestwood,**
**Bucks HP16 0NN**



# HISOFT PASCAL DEVPAC

## Quality ZX SPECTRUM® Software

### HISOFT PASCAL 4T

"... I haven't seen any other compiler that could match Hisoft's Pascal" ... *Using the Spectrum Micro – Autumn 1983*

"This is a very impressive product ... of benefit to any Spectrum programmer" *David Bolton ZX COMPUTING Aug/Sept 1983*

Just two comments from full length reviews of our powerful and virtually full implementation of Standard Pascal. The advantages of using Pascal are well-known – fast, self-documenting, and above all, structured programs and now, with Hisoft Pascal, you can reap all these benefits on a wide range of home computers including the 48K Sinclair Spectrum! Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!

Hisoft Pascal supports FOR ... DO, WHILE ... DO, REPEAT ... UNTIL, CASE ... OF, INTEGERs, REALs, CHARacters, RECORDs, POINTERs, SETs, ARRAYs etc. etc. — it is not a Tiny Pascal but a virtually full implementation of the language allowing the user to develop true high-level language skills while attaining execution speed close to that of machine code. Complete with a 70 page manual.

### HISOFT DEVPAC 3

"... DEVPAC is most highly recommended. The documentation is first class" *Your Computer May 1983*

"... if you write programs in machine code, buy DEVPAC – it is the best currently on the market" *Adam Denning, ZX SOFT in Which Micro September 1983*

Two comments from reviews of earlier versions of DEVPAC — now we have DEVPAC 3 available: a powerful Z80 assembler with conditional assembly, assembly from tape (to enable generation of very large code files), ORG, EQU, DEFB, DEFS, DEFW, DEFM, labels of any length — in fact all you need for fast (3,000 lines per minute) and powerful assembly programming. But it doesn't stop there: DEVPAC 3 also includes an incredible debugger dis-assembler giving you a "front panel" display of the Z80 system and allowing extensive debugging of your machine-code program, including single-stepping programs **EVEN IN ROM!!** Open up the secrets of low-level programming with DEVPAC 3.

**Prices:**
**Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive**
**(NewBrain, SHARP MZ700 etc) £35 plus VAT**
**Hisoft DEVPAC 3 (ZX SPECTRUM) £14 inclusive**
**(NewBrain £25 inclusive**

●●●STOP PRESS●●● Hisoft Pascal for the SPECTRUM now comes complete with a Turtle Graphics package allowing fast and easy production of complex graphic displays

**HISOFT**
**13 Gooseacre, Cheddington**
**Leighton Buzzard, Beds. LU7 0SR**
**Tel: (0296) 668995**

## Pre-defined Sounds

### on Dragon

This short machine code routine shows what can be done on the Dragon when using machine code. It gives three pre-defined sound effects which are an explosion, laser and gunshot. The sounds are accessed by the *Usro* (value) function whose value is a number between 1 and 3. I have included a check sum to check for data errors.

As a final point I have discovered a strange *Rom* routine which deletes all the line numbers from any Basic program. To try it *Exec* 35996.

```
 10 '++++++++++++++++++++++++++++
 20 '++++ Popular Computing ++++
 30 '++++      Weekly       ++++
 40 '++++PRE-DEFINED SOUNDS++++
 50 '++++BY N.EDMUNDS 1983.++++
 60 '++++FOR THE DRAGON 32.++++
 70 '++++++++++++++++++++++++++++
 80 'USR0(1)=GUNSHOT
 90 'USR0(2)=LASER
100 'USR0(3)=EXPLOSION
110 REM CLEAR 200,32000
120 DATA 8D,8B,27,5D,27,04,C1,03,23,05,C6,02,7E,B3,44,C1,
    01,26,37,34,12,B6,FF,23,8A,08,B7,FF,23,7F,01,47,8E,B7,
    98,A6,80,6D,1A
130 '
140 DATA A6,80,8D,10,7A,01,47,26,F3,B6,FF,23,84,F7,B7,FF,
    23,35,12,39,B4,01,47,B7,FF,20,86,41,4A,26,FD,39
150 '
160 DATA 12,12,12,12,12,C1,02,26,37,34,32,B6,FF,23,8A,08,
    B7,FF,23,8E,00,01,86,FD,B7,FF,20,8D,17,7F,FF,20,8D,12,
    30,01,8C,00,9B,25,ED
170 '
180 DATA B6,FF,23,84,F7,B7,FF,23,35,32,39,1F,12,31,3F,26,
    FC,39,12,12,12,12
190 '
200 DATA 12,12,12,12,12,34,12,B6,FF,23,8A,08,B7,FF,23,7F,
    01,47,8E,B7,98,A6,80,■,1A,A6,80,8D,10,7A,01,47,26,F3,
    B6,FF,23,84,F7
210 '
220 DATA B7,FF,23,35,12,39,B4,01,47,B7,FF,20,86,FE,4A,26,
    FD,39
230 'END OF DATA
240 '**BASIC LOADER FOR CODE*****
250 DATA "END"
260 READ a$:IF a$="END" THEN 320
270 LET x=VAL("&H"+a$)
280 POKE 32000+c,x
290 cs=cs+x
300 c=c+1
310 GOTO 260
320 IF cs<>19623 THEN PRINT"DATA ERROR.":STOP
330 DEF usr0=32000
340 PRINT"GUNSHOT=USR0(1)"
350 FOR d=1 TO 300:NEXT d
360 a=usr0(1)'1=LASER.
370 PRINT"LASER=USR0(2)"'2=LASER.
380 FOR d=1 TO 300:NEXT d
390 a=usr0(2)
400 PRINT"EXPLOSION=USR0(3)"
410 FOR d=1 TO 300:nextd
420 a=usr0(3)'3=EXPLOSION.
430 '++++++++++++++++++++++++++++++++
User functions:-
USR0(1)=Gunshot sound.
USR0(2)=Laser sound.
USR0(3)=Explosion sound.
```

**Pre-defined sounds**
*by N Edmunds*

## Telephone

### on Spectrum

This program is a menu-driven user-friendly telephone directory for either model of Spectrum. The 48K Spectrum will allow for about 600-700 entries. The necessary alterations for 16K are included below. To alter the program for n entries:

Line 200 to: 200 Dim LS (n,32)
Line 2060 to: 2059 For A = 1 to n
Line 2143 to: 2143 For A = 1 to n
Line 3050 to: 3050 For A = 1 to n

**Program notes**

| | |
|---|---|
| 20 | Colours. |
| 30 | Poke *Caps Lock*. |
| 40-99 | Print menu. |
| 200-230 | Variables. |
| 1000-1190 | ADD an entry routine. |
| 2000-2190 | DELETE an entry routine. |
| 3000-3080 | SEARCH for an entry routine. |
| 4000 | EXIT from program |
| 5000-5030 | LOAD a file. |
| 6000-6030 | SAVE a file. |

**Variables**

| | |
|---|---|
| A = | Search, delete loops |
| L = | Entry number. |
| A$ = | Menu List |
| D$ = | Entry to be added to list |
| E$ = | Entry to be erased |
| LS (n,32) = | List of n entries each of 32 characters. |
| Q$ = | Entry to be searched for. |
| Y$ = | File to be *Saved/Loaded* |

```
  2 REM ********************
  5 REM * TELEPHONE DIRECTORY *
 10 REM * © D. HARRISON 1983 **
 12 REM ********************
 20 BORDER 0: PAPER 0: INK 7: C
LS
 30 POKE 23658,8
 35 GO SUB 200
 40 PRINT TAB 5;"TELEPHONE DIRE
CTORY": RESTORE
 50 PRINT : PRINT
 60 FOR A=1 TO 6: READ A$
 70 PRINT AT A*3,6;A;AT A*3,9;A
$
 80 NEXT A
 90 DATA "ADD A NUMBER","DELETE
 A NUMBER","SEARCH","EXIT PROGRA
M","LOAD A FILE","SAVE A FILE"
100 LET I$=INKEY$: IF I$="" THE
N GO TO 100
110 IF I$<>"1" AND I$<>"2" AND
I$<>"3" AND I$<>"4" AND I$<>"5"
AND I$<>"6" THEN GO TO 100
120 LET GOTO=CODE I$-48
130 GO TO (GOTO*1000)
140 STOP
200 DIM L$(500,32)
210 LET L=1
220 DIM Z(100)
230 LET ZZ=1
999 RETURN
1000 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY";AT 2,0;"1. ADD A NU
MBER."
1010 PRINT : PRINT "PLEASE TYPE
IN THE ENTRY YOU     WISH TO ADD
TO THE DIRECTORY ANDTHEN PRESS
ENTER'."
1020 INPUT D$
1030 IF LEN D$>32 THEN PRINT AT
9,0; FLASH 1;"SORRY, YOUR ENTRY
IS TOO LONG.  MAXIMUM LENGTH ALL
OWED IS 32     CHARACTERS.
               ": GO TO 1020
1040 PRINT AT 13,0;"IS THIS ALL
O.K. ?";AT 15,0;D$;AT 17,0;"IF N
OT, THEN PRESS 'N' AND YOU  WILL
 BE TRANSPORTED BACK TO THE MENU
. PRESS 'Y' TO ADD THIS      ENTR
Y TO YOUR DIRECTORY."
1050 IF INKEY$="" THEN GO TO 105
0
1060 IF INKEY$<>"Y" AND INKEY$<>
"N" THEN GO TO 1050
```

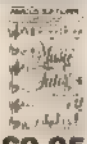
ABACUS SOFTWARE-UK-LIMITED.
21 UNION STREET RAMSBOTTOM, Nr. BURY LANCS.

DRAGON 32

**MATHS TUTOR.**

A SET OF PROGRAMS FOR TEACHING MATHS TO YOUNG CHILDREN (3-10 YEARS).

**£5.00**



**MUSIC TUTOR.**

LEARN MUSIC WITH THIS COMPREHENSIVE PACKAGE THAT USES HIGH-RES. GRAPHICS AND ALL THE DRAGONS MUSIC FACILITIES. THE PACKAGE INCLUDES DEMO. PROGRAMS.

**£9.95**

**EDUCATION**

ARTIST £5.00
CREATE PICTURES, DESIGNS AND PATTERNS THAT CAN BE REPLICATED, PAINTED OR STORED AT THE TOUCH OF A BUTTON.

METRICAL £5.00
A CONVERSION PROGRAM FOR METRIC UNITS.

'O' LEVEL GEOGRAPHY £6.50
WEATHER MAP SYMBOLS
A TEACHING AID IN HI-RES. GRAPHICS THAT ARE 'O' LEVEL SYLLABUS.

TELL THE TIME £6.50
IN ENGLISH, FRENCH OR GERMAN!
PROGRAM USES HIGH-RES. GRAPHICS AND SOUND TO TEACH CHILDREN HOW TO TELL THE TIME IN EITHER ENGLISH, FRENCH OR GERMAN.

MEASURING INSTRUMENTS £6.50
A TEACHING AID FOR O LEVEL PHYSICS USING 100% HIGH-RES. GRAPHICS TO DEMONSTRATE THE USE OF MICROMETERS, VERNIER SCALES ETC.

FIRST LETTERS AND WORDS £6.50
A PROGRAM DESIGNED TO HELP CHILDREN FORM LETTERS AND USE THEM IN SIMPLE WORDS AND SENTENCES.

MANY MORE PROGRAMS AVAILABLE
SEND S.A.E. FOR DETAILS

**The Waters of Life**

YOU ALONE CAN FIND THE WATER OF LIFE AND SAVE THE MIGHTY EMPIRE OF OMIN FROM THE EVIL FORCES.

**£7.95**

**Diplodia**

JOIN THE MISSION AND DESTROY THE EVIL VIC SINCLAIR BEFORE HE DOMINATES THE MICRO MARKET.

**£6.50**

Tel. BOLTON 383839

GENEROUS DEALER DISCOUNTS



# VIC20

**32K SWITCHABLE TO 3K, 16K, 24K, BLOCK 5**

**£49.95** inc. VAT

**16K SWITCHABLE TO 3K**

**£34.95** inc. VAT

**16K STANDARD**

**£27.95** inc. VAT

All units guaranteed 2 years. Add £1 P&P
Overseas orders add £3 P&P
Telephone your Access or Visa card number for despatch by return post, or send your cheque/POs to:

**RAM ELECTRONICS (FLEET) LTD**
(DEPT. WM)
**106 FLEET ROAD, FLEET, HANTS GU13 8PA**
**Telephone (02514) 5858**
Callers welcome Monday to Saturday
Half-day Wednesday. Trade enquiries welcome

# POOLSWINNER

**THE ULTIMATE POOLS PREDICTION PROGRAM**

**PREDICTS** Not just SCOREDRAWS, but NOSCORES, AWAYS and HOMES

**IT WORKS** We **guarantee** the program performs significantly better than chance

**ADAPTABLE** "Poolswinner" allows the precise prediction formula to be set by the user — you can develop and test your own unique method. Probabilities are given on **every** fixture — choose as many or as few selections as you wish

**EASY TO USE** Fully menu driven, with detailed instruction booklet

**DATABASE** The program comes complete with the largest database available — over 20,000 matches. The database automatically updates as results come in

*APPLE, BBC (B), COMMODORE 64, DRAGON, SPECTRUM (48K), ZX81 (16K)*
**£15** (all inclusive)

We produce databases for those developing their own prediction program. Two years results £7.50. Five years results £12.50

Available from dealers, or direct (return of post) from . . .

VISA **Selec Software**

**37 COUNCILLOR LANE, CHEADLE, CHESHIRE 061-428 7425**
DEALER ENQUIRIES WELCOME



**PRESENTING THE BEST GAME EVER SEEN ON YOUR DRAGON 32**

# CASTLE ATTACK

**£6.50 INCLUSIVE**

AN EXCELLENTLY ANIMATED HIGH RESOLUTION ALL ACTION ARCADE STYLE GAME DESIGNED TO STRETCH YOUR MIND TO ITS ULTIMATE LIMIT. THE BEST EVIDENCE THAT COMPUTER GAMING HAS COME OF AGE FOR YOUR DRAGON 32. A SUPERB DEMONSTRATION OF DRAGON 32 SOFTWARE CAPABILITIES PUTTING OTHERS TO SHAME. A CLASSIC IN ITS OWN RIGHT. DON'T SEE ANOTHER COMPUTER GAME UNTIL YOU'VE SEEN CASTLE ATTACK. NO SOFTWARE COLLECTION SHOULD BE WITHOUT IT. AN EXCITING, FAST MOVING MACHINE CODE GAME YOU CANNOT AFFORD TO MISS. BUY IT.

FROM **M & D systems**
MAKE CHEQUES/PO PAYABLE TO M&D SYSTEMS
OF **24 MEADWAY, FRIMLEY, SURREY**
NO JOYSTICKS REQUIRED.
DEALERS ENQUIRIES WELCOME.

```
1070 IF INKEY$="N" THEN CLS : GO
 TO 40
1080 IF INKEY$="Y" THEN LET L$(L
, TO LEN D$)=D$: LET L=L+1
1090 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY"
1100 PRINT : PRINT : PRINT "ENTA
Y SUCCESSFUL !!!";AT 8,0;"PRESS
ANY KEY TO CONTINUE.": PAUSE 0:
CLS : GO TO 40
2000 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY": PRINT
2010 PRINT "2. DELETE AN ENTRY"
2020 PRINT : PRINT : PRINT "TYPE
 IN AS MUCH AS YOU KNOW OF  THE
ENTRY WHICH YOU WISH TO     ERAS
E."
2030 INPUT E$
2040 IF LEN E$>32 THEN PRINT AT
6,0; FLASH 1;"SORRY THIS IS TOO
LONG FOR THIS PARTICULAR DIRECTO
RY, PLEASE TRYAGAIN.
                 ": GO TO 2030
2050 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY": PRINT : PRINT
2060 FOR A=1 TO 500
2065 LET LEN1=LEN E$
2070 IF L$(A, TO LEN1)=E$ THEN P
RINT L$(A, TO LEN L$(A)): LET Z\
ZZ)=A
2080 NEXT A
2090 PRINT "END OF SCAN."
2100 PRINT : PRINT "DO YOU WISH
TO ERASE THESE     ENTRIES ?"
2110 PRINT : PRINT "TYPE 'Y' FOR
 YES, 'N' FOR NO."
2120 IF INKEY$="" THEN GO TO 212
0
2130 IF INKEY$<>"Y" AND INKEY$<>
"N" THEN GO TO 2120
2140 IF INKEY$="N" THEN CLS : GO
 TO 40
2142 PRINT : PRINT "DELETING "
2143 FOR A=1 TO 500
2145 IF L$(A, TO LEN1)=E$ THEN L
ET L$(A)=""
2150 NEXT A
2180 PRINT : PRINT "ENTRIES ERAS
ED.": PRINT : PRINT "PRESS 'ENTE
R' TO CONTINUE."
2190 INPUT K$: CLS : GO TO 40
3000 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY": PRINT : PRINT
3010 PRINT "3. SEARCH.": PRINT :
 PRINT
3020 PRINT "INPUT THE ITEM YOU W
ISH TO      SEARCH FOR."
3030 INPUT 0$: CLS
3040 LET W5=LEN 0$
3050 FOR A=1 TO 500
3055 LET F$=L$(A)
3060 IF F$( TO LEN 0$)=0$ THEN P
RINT L$(A)
3070 NEXT A
3080 PRINT : PRINT "SCAN COMPLET
ED.": PRINT : PRINT "PRESS ANY K
EY TO CONTINUE.": PAUSE 0: CLS :
 GO TO 40
4000 CLS : STOP
5000 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY": PRINT : PRINT
5005 PRINT "5. LOAD A FILE.": PR
INT : PRINT
5010 PRINT "PLEASE TYPE IN THE N
AME OF THE  FILE WHICH YOU WISH
TO LOAD."
5020 INPUT Y$
5030 PRINT : PRINT : PRINT "STAR
T THE TAPE AND THEN PRESS  ANY
KEY": PAUSE 0: LOAD Y$ DATA L$()
: CLS : GO TO 40
6000 CLS : PRINT TAB 5;"TELEPHON
E DIRECTORY": PRINT : PRINT "6.
SAVE A FILE.": PRINT : PRINT "PL
EASE TYPE IN THE NAME OF THE  FI
LE."
6010 INPUT Y$
6020 SAVE Y$ DATA L$()
6030 CLS : GO TO 40
```

**Telephone**
*by David Harrison*

## Cobwebs

on Dragon

This program will produce a series of cobweb effects, going through the five graphic modes on the Dragon.

**Program notes**

| | |
|---|---|
| 10-30 | Prints the title. |
| 40-50 | Defines the mode and sets up the screen. |
| 60 | Starts loop for drawing cobwebs. |
| 70-90 | Checks how cobwebs are to be drawn. |
| 100-150 | Draws cobwebs. |
| 160-170 | Pause in program, clears screen. |
| 180-190 | Repeat until the loop is finished. |

```
10 CLS:PRINT@203,"cobwebs"
20 FOR XX=1 TO 2000
30 NEXT XX
40 FOR S=0 TO 4
50 PMODES,1:PCLS:SCREEN1,1
60 FOR KK=4 TO 16 STEP 4
70 IF KK=12 OR KK=20 THEN 90 ELSE 80
80 FOR A=0 TO 255 STEP KK:GOTO100
90 FOR A=255 TO 0 STEP -KK
100 Y=FIX(A*191/255)
110 LINE(0,Y)-(A,191),PSET
120 LINE(A,191)-(255,191-Y),PSET
130 LINE(255,191-Y)-(255-A,0),PSET
140 LINE(255-A,0)-(0,Y),PSET
150 NEXT
160 FOR D=1 TO 2000:NEXTD
170 PCLS
180 NEXT KK
190 NEXT S
```

**Cobwebs**
*by J Blatch*

# RUNESOFT

*presents*

**ORIC 1**

***RUNEPACK 1:*** by M R Chambers.
A collection of six programs for all the family for the 16/48K Oric 1.

1. Codebreaker
2. UXB
3. Tick-Tack-Toe
4. Hangman
5. Windmills
6. Biorhythms

Great Value at **£6.95**.

**SPECTRUM 48K**

***SPECTREALM:*** by J A Slack.
Can you help Spectria survive 100 years under your government policies . . . buy power stations . . . factories . . . fuel . . . and food plus many more assets to help Spectria become a world super power. For one or two players, at only **£6.95**.

*Send cheques/PO to:*
**Runesoft, Chamwood House, 9 Lower Parliament Street, Nottingham NG1 3BB**

Both cassettes are beautifully packaged with gold blocked, black leather effect inlay cards and instruction leaflet.

*available soon*

DRAGONIA — Dragon 32
PARADOX — Spectrum 48K

*Trade enquiries welcome.*

# New from SUNSHINE

## Master your ZX Microdrive

**programs, machine code and networking by Andrew Pennell**

Master your ZX Microdrive contains all the information you will ever need ■ use the ZX Microdrive to the full. Clearly explained, with many examples, it is equally suitable for the relative newcomer to BASIC through to the experienced machine code programmer.

ISBN 0 946408 19 X

Andrew Pennell has also included a full database file handling program to let you put the ZX Microdrive ■ practical use with your Sinclair Spectrum.

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores. Dealer Enquiries: 01-437 4343

Please send me

☐ Master your ZX Microdrive at £6.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books, 12/13 Little Newport St., London WC2 7LD.
Or phone your order through on Access Mastercard 01-437 4343

Name _____

Address _____

_____

Signature _____

We can normally deliver in 4/5 days.

# Wizard Software

## FOR DRAGON 32
## ZX SPECTRUM 48K
## ORIC-1 48K

**DRAGON STAR TREK** — **DRAGON 32** — **£8.45**
A real time version featuring a 10 × 10 galaxy, shield control, photon torpedoes, status reports, signals received, galactic search, scanner control, warp drive, star bases with docking, black holes, planets and planet landfall, pulsars, novas, stars, asteroids, meteors, shuttles and shuttle docking, automatically converging and attacking Klingons. Four levels of difficulty, comes with instruction manual.

**TIME PORT 1** — **DRAGON 32** — **£8.45**
**ZX SPECTRUM 48K** — **£6.95**
The first in a series of five adult strategy adventure games. Direct your robot and acquire the object that the Keeper will ask for and bring it safely back to the Time Port.

**EVICTOR** — **DRAGON 32 and ORIC-1 48K** — **£7.95**
**ZX SPECTRUM 48K** — **£5.95**
An original arcade game presented in high resolution graphics with machine code for extra zip. Evict the aliens from their self-regenerating and defended base. Features lasers, phasors and bombs. Five skill levels. Dragon 32 and Oric-1 versions feature a demonstration mode.

RECOMMENDED ■ THE MICROCOMPUTER SOFTWARE CLUB

*All prices inclusive. Mail order. Cheques or postal orders to.*

**WIZARD SOFTWARE, DEPT. PCW, PO BOX 23**
**DUNFERMLINE, FIFE KY11 5RW**

Also available from software retailers in UK, Europe and Africa
Send large SAE (7in. × 5in.) for full program catalogue
Royalties paid for superior quality DRAGON 32 and ORIC-1 software

# SPECTRUM EXTENDED BASIC

**—IMPROVE YOUR PROGRAMMING —EASE DE-BUGGING**
**—HELPS YOU ADD STRUCTURE TO YOUR PROGRAMS**

The ten additional BASIC commands provided by Spectrum Extended Basic are considered an essential aid for most programming applications, so much so that many of these commands are standard features on other Basics.

The program ■ compact, occupying less than 5K memory, is user friendly—requiring only a two keyentry—and incorporates syntax checking.

The program commands are used and entered just like normal Basic keywords, the program operates bytrapping your usual keyboard input and testing for any of the ten additionalcommands.

**The extra commands available are:**

- AUTO — auto line number, start and interval definable.
- CLOCK — ON/OFF 12 hour clock displayed on screen
- DELETE — Basic linesblock delete
- EXAMINE — reads tape headers and displays information.
- FIND — find specified string in Basic program
- MEMORY — displays memory status
- RENUMBER — full line renumber with GOSUBs and GOTOs
- SCROLL — ON/OFF continuous scrolling
- TRACE — ON/OFF slows program execution, displays line and statement currently executed
- VARIABLES — displays variable names and contents.

**48K Spectrum Extended Spectrum—£9.95**

Also available at Boots, W.H. Smith and all good computer shops.
**DELIVERY:** Send SAE for Catalogue.
**UK**—prices include VAT and postage & packing
**EUROPE**—add 80p per program
**ALL OTHER PLACES**—for air mail add ■ for the first program and 50p for each subsequent program. Surface delivery add 80p per program.

cp software

Send Cheque, Postal Order or Access No. to:
**CP SOFTWARE, Dept PCW1A**
**17 Orchard Lane, Prestwood,**
**Bucks HP16 0NN**

## Cell Attack

### on Vic20

The object of the game is to stop the chromosomes, germs, etc. from breaking through the spongy layer of the cell. To stop them, control your miniaturised culture dish using keys < left > right. Simple? Just ask your white blood cells what they do every day?

**Program notes**

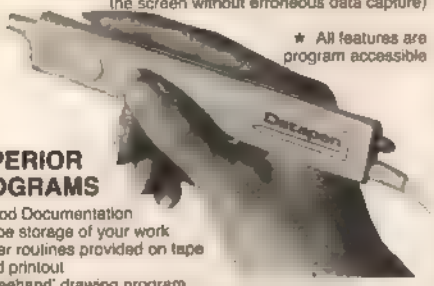
| | |
|---|---|
| 1-20 | Initialisation. |
| 30-78 | Titles Page. |
| 80-92 | Set up Screen 1. |
| 110-160 | Select alien type. |
| 170-230 | Move alien. |
| 240-350 | Explosion and End page. |
| 1000-1050 | Movement left/right. |
| 2000-2020 | Sound |
| 5000-5070 | Hi res. |
| 6000 | Screens 2/3. |

```
3 REM BY G.CARROTT
4 HI=0:W=30:POKE36878,15:GOSUB5000
5 V=36878:POKE650,128
10 PRINT"■":POKE36879,156:C=30720:SA=7999
20 SC=0
30 PRINT"■■■      CELL ATTACK       ■";
40 PRINT"■■ STOP THE CHROMOSONES  ENZYMES,
GERMS,POLYPS  AND ANTIBODIES FROM"
50 PRINT" ATTACKING YOUR CELLS  IF THEY BR
EAK INTO    YOUR CELL YOURE DEAD"
60 PRINT"■■■■ATTACKERS■    ■CONTROLS■"
70 PRINT"■ -CHROMOSONE   ■K■-LEFT"
71 PRINT"■ -ENZYME        ■■■-RIGHT"
72 PRINT"■ -GERM"
73 PRINT"■ -POLYP      HI="HI
74 PRINT"■ -ANTIBODY"
75 PRINT"■■■HIT SPACE TO CONTINUE"
76 GETA$ IFA$<>" "THEN76
78 FORI=1TO22 PRINT FORT=1TO20 NEXT NEXT
79 PRINT"■" POKE36869,255
80 PRINT"■■■■■■■■■■■■■■■■■■■■■■";
81 PRINT"FGFGFGFGFGFGFGFGFGFGFGFFFFFFFFFFFF
FFFFFFFFFF"
82 PRINT"IIIIIIIIIIIIIIIIIIIII"
90 PRINT"IIIIIIIIIIIIIIIIIIIII"
91 PRINT"TT■■■■ ■■■"SC"     ■"
92 REM
100 U=INT(RND(1)*5)+1
101 IFSC>50ANDSC<56THENGOSUB6000
102 IFSC>100ANDSC<1006THENGOSUB9000
110 ONUGOTO120,130,140,150,160
115 GOTO100
120 X=1:CL=2:G=1  GOTO170
130 X=3  CL=2 G=2  GOTO170
140 X=2 CL=6 G=4  GOTO170
150 X=4 CL=0 G=6  GOTO170
160 X=5:CL=4:G=10
170 D=7702
171 F=INT(RND(1)*18)+2
175 POKED+F,X:POKED+F+C,CL
176 D=D+F:D1=D+F+C
185 GOSUB1000
186 PRINT"■■■■■■■■■■■■■■■■■■■
```

## A QUALITY LIGHT PEN

### SUPERIOR PERFORMANCE

- ★ Absolutely insensitive to ambient lighting.
- ★ Responds to different colours and screen intensities without any adjustment of TV or monitor.
- ★ Red LED readout showing that data is available.
- ★ Switch for program control (allows pen to approach the screen without erroneous data capture)
- ★ All features are program accessible




### SUPERIOR PROGRAMS

- ★ Good Documentation
- ★ Tape storage of your work
- ★ User routines provided on tape and printout
- ★ 'Freehand' drawing program
- ★ 'Library menu' drawing program (define your own library of shapes)
- ★ Example programs illustrating uses of the pen and its features

**£25**

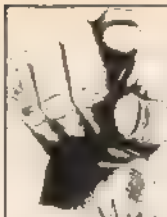
inclusive of P&P etc.

**Please state Dragon, BBC or Vic20 when ordering. Send cheque or P.O. to: Dept DU1, Datapen Microtechnology Ltd., Kingsclere Road, Overton, Hants.**

*Please enclose SAE if requesting technical literature.*
*We welcome enquiries from dealers willing to demonstrate our product.*

**Datapen Microtechnology Limited**





## HEY YOU !!!

## SPECTRUM OWNER

**DON'T MISS THESE**

NEW RELEASE

**FARMER**-16K/48K Arcade Game.
All machine code - Super graphics.
Progressive difficulty feature
Bonus scores - User tested.

A highly addictive game - How good are you at avoiding Fox Hunts, Bulls, Lorries, Tractors, Etc. ?Can you 'out Fox' the Dog & Hen to save the corn ?

NEW RELEASE

**ASSIGNMENT EAST BERLIN**
48K Adventure Game.
Machine code search routines for fast response, quick save & auto vertify (10 secs each).

Have you got what it takes to survive as a Spy in East Berlin ? You will be pursued by Police at every turn, will you complete your Mission ? Who is the Thin Man ? What secret does the Blonde Hostess hide ?

Both games user tested before release.
Both games £5.95 each inc post & package.

Link Enterprises, 20 Derwent St, Consett, Co. Durham.

Name. _____

Address. _____

Please rush me, by return of post, within 48Hrs. At £5.95 each : Farmer. Assignment East Berlin. I enclose

Cheque / P.O. No. .....



# Experience CDS programs yourself

*This is 'Magic Meanies' a brand new Arcade game from CDS. Just one of a new range of exciting programs... Arcade action.. 3D Space adventures Education and pure fantasy...*

ONLY £5.95 each at W.H.Smiths, *Boots, John Menzies and other leading Computer Stores, or...

Available direct from CDS Micro Systems
10, Westfield Close, Tickhill, Doncaster DN11 9LA
Send Cheque or P.O. To CDS
Tel:(0302)744129.

* Selected titles only



**ALPHA-NUM**
(Spectrum 48K-Modified Version for 16K)
Nine-feature menu includes alphabetical and numerical sorting, indexing, review, update and copy (for printer). An invaluable aid for writers, teachers (register, marks, etc). Small traders and hobbyists of all kinds.

**HOME INVESTOR**
(Spectrum 16K/48K)
An essential program for the private investor. Menu driven program enables user to ascertain future value of investment: actual rate of growth, present values; period required to amass specific sum; mortgage and annuity calculations; flat and redemption yields; net of tax returns . . . and still more!

**EACH £4.95 — BOTH FOR £8.95 (POST FREE)**

**ORIGINAL SPECTRUM UTILITIES AT REDUCED PRICES**
ZXed Toolkit (DK Tronics) £5.00. Compiler (Wye Valley) £8.50. 64 Print/Master Define (Ahmed) £3.50. Kopycat (Med Soft) £3.00. ZX Toolkit (Star Dreams) £5.00

**R. G. WINFIELD** BSc (Econ) FRI
**Dept 1, 7 Gore Lane, Rayne, Essex CM7 8RL**



C.C.S. LTD.

# SAFFRON

SOFTWARE

URGENTLY REQUIRE

**GAMES PROGRAMS OF THE HIGHEST QUALITY FOR THE SPECTRUM, ORIC, VIC20, COMM 64, BBC**
Cash payments or royalties

Send your masterpiece, in the strictest confidence to:
**C.C.S. Ltd, Saffron, 174a High Street, Hornchurch, Essex RM12 6QP. Tel: (04024) 75613.**

**PROGRAMMERS!!**
Are you hell bent for recognition? Then contact Saffron

## Dual

### on BBC

Dual is a program for two players. It should work on either A or B. The idea of the game is to destroy your partner ten times as you move left and right.

**Program notes**

10 — 160 Instructions
170 — 260 Initialise all variables
270 — 360 Defined characters
370 — 510 Print score and cowboys
520 — 600 Input and move cowboys
610 — 640 Prevents move off screen
650 — 920 Moves bullets
930 — 1030 Would you like another game?

```
 10 MODE 7
 20 CLS
 30 PRINT"                    DUAL"
 40 PRINT"                    ****"
 50 PRINT" TSCORE=THE TOP MANS SCORE."
 60 PRINT" BSCORE=THE BOTTOM MANS SCORE."
 70 PRINT
 80 PRINT" THE IDEA OF THE GAME IS TO
    DESTROY YOUR OPPONENT BY HITTING HIM
    TEN  TIMES."
 90 PRINT
100 PRINT"KEYS:"
110 PRINT"TOP MAN= Z=LEFT  X=RIGHT
    A=FIRE"
120 PRINT"BOTTOM MAN= ,=LEFT  .=RIGHT
    ;=FIRE"
130 PRINT
140 PRINT"          (HIT A KEY TO BEGIN)"
150 B$=GET$
160 IF B$=""THENGOTO 160
170 SC=0:S=0
180 CLS
190 COLOUR 131
200 MODE 2
210 X=5
220 Y=1
230 Z=10
240 C=28
250 COLOUR 131
260 CLS
270 VDU 23,248,0,0,60,60,255,255,255,255
280 VDU 23,249,60,60,60,60,60,60,60,60
290 VDU 23,240,56,254,124,146,238,254,
    198,124
300 VDU 23,241,56,124,186,186,186,84,
    56,56
310 VDU 23,242,40,40,40,40,40,40,108,
320 VDU 23,243,56,254,124,146,238,
    254,198,124
330 VDU 23,244,56,124,186,186,186,
    84,56,56
340 VDU 23,245,40,40,40,40,40,40,108,0
350 VDU 23,250,24,24,24,219,219,219,
    255,255
360 VDU 23,251,24,24,24,24,60,126,0,0
370 COLOUR 2
380 PRINTTAB(0,0);"TSCORE:";S
390 PRINTTAB(11,0);"BSCORE:";SC
400 COLOUR 1
410 PRINTTAB(X,Y);" ";CHR$240;" "
420 PRINTTAB(X,Y+1);" ";CHR$241;" "
430 PRINTTAB(X,Y+2);" ";CHR$242;" "
440 PRINTTAB(Z,C-2);" ";CHR$243;" "
450 PRINTTAB(Z,C-1); " ";CHR$244;" "
460 PRINTTAB(Z,C);" ";CHR$245;" "
470 COLOUR
480 PRINTTAB(3,15);CHR$250
490 PRINTTAB(3,16);CHR$251
500 PRINTTAB(14,17);CHR$250
510 PRINTTAB(14,18);CHR$251
520 A$=GET$
530 PRINTTAB(0,0);"TSCORE:";S
540 PRINTTAB(11,0);"BSCORE:";SC
550 IFA$="Z"THENX=X-1:GOTO 610
560 IFA$="X"THENX=X+1:GOTO 610
570 IFA$=";"THENGOTO690
580 IFA$="."THENZ=Z+1:GOTO 650
590 IFA$=","THENZ=Z-1:GOTO650
600 IFA$="A"THENGOTO 760
610 IFX=0THENX=X+1
620 IFX=19THENX=X-1
630 COLOUR 1
640 GOTO 410
650 IFZ=0THENZ=Z+1
660 IFZ=19THENZ=Z-1
670 COLOUR 1
680 GOTO 410
690 FORT=26TO0STEP-1
700 PRINTTAB(Z+1,T-2);"."
710 FOR DELAY=1 TO 10:NEXT DELAY
720 PRINTTAB(Z+1,T-1);" "
730 NEXT T
740 IFX=Z AND  A$=";" THENGOTO830
750 GOTO 410
760 FORP=4TO27
770 PRINTTAB(X+1,P);"."
780 FORDELAY=1TO10:NEXTDELAY
790 PRINTTAB(X+1,P);" "
800 NEXT P
810 IFZ=X AND A$="A" THENGOTO 880
820 GOTO 410
830 PRINTTAB(X+1,Y);CHR$248
840 PRINTTAB(X+1,Y+1);CHR$249
850 SC=SC+1:IFSC=10THENGOTO930
860 FORT=1TO2000:NEXTT
870 GOTO 290
880 PRINTTAB(Z+1,C-1);CHR$248
890 PRINTTAB(Z+1,C);CHR$249
900 S=S+1:IFS=10THEN930
910 FORT=1TO 2000:NEXTT
920 GOTO290
930 CLS
940 MODE 7
950 PRINT"                    WELL DONE!"
960 PRINT"                    **********"
970 PRINT" YOU SHOT YOUR OPPONENT
    TO PIECES"
980 PRINT"  WOULD YOU LIKE ANOTHER
    GAME Y/N?"
990 C$=GET$
1000 IFC$="Y"THENGOTO20ELSEGOTO1010
1010 CLS
1020 PRINT"BYE-BYE HOT SHOT!"
1030 END
```

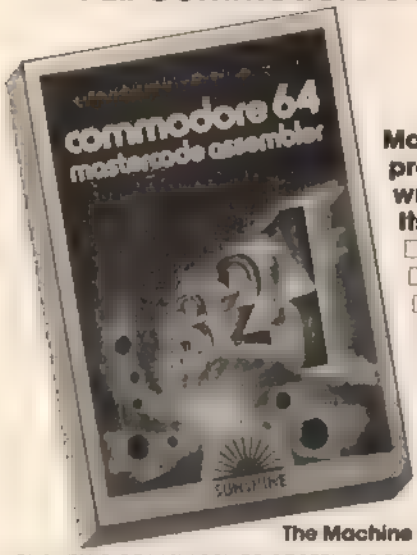
**Dual**
*by Martin Rushton*

SUNSHINE

# Mastercode Assembler

## for the Commodore 64

### Full Commodore 64 Assembler/Disassembler




**£14.95** inc VAT

**Mastercode ■ ■ substantial and complex program of use to anyone interested in writing machine code on the Commodore 64. Its features include:**

- ☐ Machinecode monitor
- ☐ File Editor
- ☐ Disassembler
- ☐ Assembler

Mastercode is a full two pass assembler. It accepts labels, variables and equations within assembly language programs. It is possible to store programs anywhere in memory, even in parts occupied by the Assembler. Programs can be saved to either tape or disc.

**The Machine Code Monitor Includes:**

■ OUTPUT OF MEMORY TO SCREEN OR PRINTER ■ MODIFICATION OF MEMORY ■ EXECUTION OF MACHINE CODE PROGRAMS ■ SAVING OF MACHINE CODE FILES ON TO TAPE OR DISC ■ LOADING OF MACHINE CODE FILES FROM TAPE OR DISC ■ STEP ■ STEP TRACING OF THE EXECUTION OF A MACHINE CODE PROGRAM, INCLUDING DISPLAY OF REGISTER CONTENTS.

The Disassembler will translate into assembly language the contents of any area of memory, whether the 64's ROM or a user program. Output may be sent either to the screen or ■ printer.

**The File Editor Includes:**

■ ENTRY OF NUMBERED LINES OF ASSEMBLY LANGUAGE INSTRUCTIONS ■ LISTING, INDIVIDUALLY OR IN BLOCKS, OF PREVIOUSLY ENTERED LINES ■ DELETION, INDIVIDUALLY OR IN BLOCKS, OF EXISTING LINES ■ RENUMBERING OF EXISTING LINES ■ SAVING OF ASSEMBLY LANGUAGE FILES TO TAPE OR DISC ■ LOADING OF ASSEMBLY LANGUAGE FILES FROM TAPE OR DISC ■ ADDITION OF A BLOCK OF MEMORY SPECIFIED BY THE USER TO THE USER'S ASSEMBLY PROGRAM

The Assembler allows the translation of assembly language programs into machine code with full error checking, labelling and ■ range of assembler directives.

LOOK OUT FOR THE SUNSHINE RANGE IN W.H. SMITH'S, BOOTS, JOHN MENZIES, OTHER LEADING RETAIL CHAINS AND THROUGH OUR NATIONAL NETWORK OF BOOK SHOPS AND SPECIALIST STORES.

Please send me ____ Commodore ■ Mastercode Assembler @ £14.95 inc VAT. I enclose cheque/postal order for £____ made payable to Sunshine 12/13 Little Newport Street, London WC2R 3LD. Or telephone your order through Access/Mastercard on 01-437 4343

Name _____

Address _____

_____

_____

Signature _____

## Averages

### on Spectrum

The program is called "averages" and I use it to work out mean and modal averages. It is written for the ZX Spectrum (either model) but should prove easy to convert to run on most other Basics. At the start of the program you will be asked how many numbers you wish to compare. Next you type in those numbers (entering each number in turn using *Enter*). Finally the computer will print a list of the numbers entered followed by the modal average (if there is one), the number of times it appears and the mean average. The option for a printout is included.

**Program notes**

| | |
|---|---|
| 100-200 | Allows for the inputing of numbers and sets up the variables. |
| 210-250 | Compares numbers inputed to see if any are the same. |
| 260-290 | Finds mode (greatest value of d). |
| 300-370 | Prints numbers, mode and the number of times that the mode appears. |
| 380-420 | Works out and prints mean. |
| 425-470 | Options available. |
| 500-590 | Printout. |

```
 100 REM AVERAGES BY SIMON SMITH
 105
 110 BORDER 0: PAPER 0: INK 7: C
LS
 120 INPUT #0;"How many numbers
in calculation (Type number then
 press ENTER) ";a
 125 IF a=1 THEN GO TO 130
 130 DIM a(a)
 140 FOR n=1 TO a
 150 INPUT a(n)
 160 NEXT n
 170 DIM c(a+1)
 180 FOR n=1 TO a+1
 190 LET c(n)=0
 200 NEXT n
 210 FOR m=1 TO a
 220 FOR n=1 TO a
 230 IF a(m)=a(n) THEN LET c(m)=
c(m)+1
 240 NEXT n
 250 NEXT m
 260 LET d=c(1)
 270 FOR n=1 TO a
 280 IF c(n)>d THEN LET d=c(n):
LET mode=a(n)
 281 IF c(n)=d THEN LET d=1
 290 NEXT n
 300 PRINT "The numbers inputted
were.....": PRINT : PRINT
 310 FOR n=1 TO a
 320 PRINT a(n)
 330 NEXT n
 340 PRINT : PRINT
 360 IF d=1 THEN PRINT "There is
no single  mode": GO TO 380
 365 PRINT "The mode  is ";mode
 370 PRINT "It appears ";d;" tim
es"
 380 LET total=0
 390 FOR n=1 TO a
 400 LET total=total+a(n)
 410 NEXT n
 420 PRINT : PRINT : PRINT "The
mean is ";total/a
 425 PRINT #0;"HIT ANY KEY TO CO
NTINUE": PAUSE 0
 430 INPUT "Press y-for a printo
ut of this  screen r-to input ne
w numbers  e-to exit the progra
m.Then pressENTER ";a$
 450 IF a$="y" THEN GO SUB 500:
GO TO 430
 460 IF a$="e" THEN STOP
 470 IF a$="r" THEN GO TO 100
 480 GO TO 430
 500 LPRINT "The numbers inputte
d were.....": PRINT : PRINT
 510 FOR n=1 TO a
 520 LPRINT a(n)
 530 NEXT n
 540 LPRINT : LPRINT
 550 IF d=1 THEN LPRINT "There i
s no single mode": GO TO 560
 560 LPRINT "The mode  is ";mode
 570 LPRINT "It appears ";d;" ti
mes"
 580 LPRINT : LPRINT : LPRINT "T
he mean is ";total/a
 590 RETURN
```

**Averages**
*by Simon Smith*

## Microradio

**GW6JJN**

### Broadcasting

This week I would like to mention another kind of radio, the broadcast radio. The BBC and IBA to be exact. Microradio has so far only dealt with the amateur and CB kind radio, but you can't keep a good thing down and the big boys are getting into the act.

Radio West in the Bristol area now has an extremely large audience for their *Datarama* programme. They transmit a microshow which discusses aspects of computing and then, late at night when only the computer freaks are about, they transmit computer programmes (the kind you *Load*). This ghastly noise can be heard in the small hours on the FM and medium wave bands for Spectrum and BBC computers. All that is needed is the trusty radio cassette recorder and there are programs to be had for free. I must add that the disc jockeys do not talk over the intro as they do on pop records much to the frustration of some.

The word is spreading and now Radio Victory is at it. They are sending *Screens* over the air with their logo and that of a certain software company not a million miles from Portsmouth; shades of Pimania no less.

As if this was not enough, BBC Radio Wales is the latest candidate vying for the poor micros time. On Fridays at 6.30 pm they have their own computer programme and will be transmitting the *Loading* kind as well. These will be in Basic for most microcomputers (and, I expect, Welsh for the Dragon). Radio Wales transmits its broadcasts and funny noises on 882Khz in the medium wave.

All of this has been too much for me. I don't get enough sleep as it is. There is a rumour that I have been seen coming and going about the studios of Swansea Sound Radio. I have always had a hankering to be a floppy disc jockey, so who knows, but that's another story.

A quick word for all those lucky people who live in the Duchy of Cornwall. The Cornish Amateur Radio Club now has a computer section devoted to the likes of us. I attended one of these meetings a while ago and was very impressed. Radio computing is becoming very popular down in the southwest where most people have BBC micros, as I understand. Local listeners who cannot understand conversations on the amateur bands emanating from the Cornwall area can now be told that *The Philosophers Quest* has been solved and the region is back to normal.

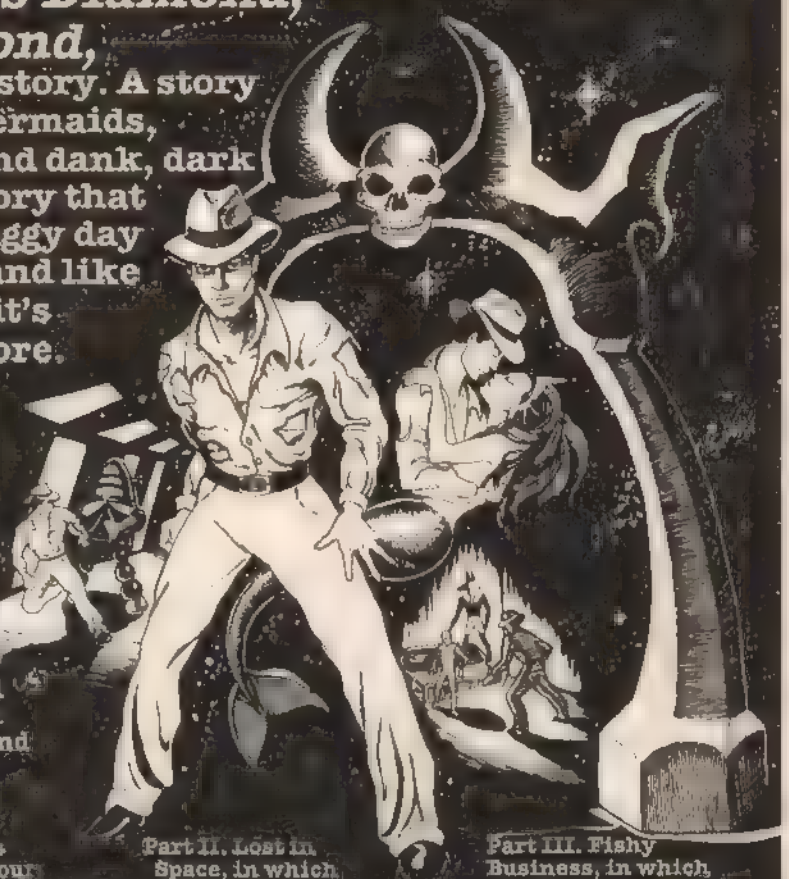
One point: please note that information about the Cornish Club can be obtained from Simon Rodda on Penzance 3948. A second point is that when writing to the addresses I give in this column, a stamped addressed envelope will always bring a reply. It is common courtesy, after all. ■

**Ray Berry GW6JJN**

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

# THE DAN DIAMOND TRILOGY

***My name is Diamond, Dan Diamond,***
**and this is my story. A story of beautiful mermaids, bored robots and dank, dark dungeons. A story that started one muggy day in New York, and like the Big Apple, it's rotten to the core.**



The Dan Diamond Trilogy is three separate adventure games. Each game may be played on its own, but clues may be found in the earlier adventures which may help later on. Each game comes with a lavishly illustrated 20-page case file, and hints (both helpful and misleading) which have been hidden in the illustrations.

Part I. Franklin's Tomb, in which our hero receives a mysterious plea for help which leads him to a hidden tomb and the mystery of the stargate.

Part II. Lost in Space, in which our hero finds himself stranded on a derelict spacecraft, doomed to travel endlessly through space, or find a way out.

Part III. Fishy Business, in which our hero lands on a watery planet, discovers the source of the plea for help and saves the day.

"It must be the most consistently enjoyable adventure game I've ever played"
– Computer Choice
(Programme of the Month)

All three programs cost £9.95 each and are available for the DRAGON 32, BBC MODEL B and 48k ORIC-1 microcomputers. (note: Fishy Business for the BBC and ORIC will be available February 1984).

Cheques or postal orders payable to

# Salamander SOFTWARE

17 Norfolk Road, Brighton, East Sussex, BN1 3AA.

Look out for Dan Diamond's next Adventure Series "Franklin in Wonderland" Available Spring 1984

# Number one

I have a letter this week from Blair McGlashan of Swanley in Kent. He has a few tips for you to try out while playing *The Hobbit*.

"You may have noticed," he writes, "how the rope may be used for getting the torches in the goblin's cavern, and the elvenking's hall, by tying the torch and then taking the rope. You now carry the rope, with the torch tied to it."

Another anomaly that Blair has noticed is that the barrel can be used to carry objects that would otherwise be too heavy to carry. Now, says Blair, the player is able to use this in order to take any object that is mentioned in the program's description of each location. Thus, should you wish, for some strange reason, to collect the curtain ■ Beorn's House, go about it this way:

TIE CURTAIN
OPEN BARREL (you will, of course, have to have the Barrel!)
PUT ROPE IN BARREL (ditto the rope!)
EMPTY BARREL
UNTIE ROPE

Now, if you ask the computer for an inventory, you should find that you are carrying the curtain. This can be repeated for any inanimate object present at any of the locations, the only stumbling-block being that only that object may be carried.

Blair also throws some light on the "Barrelbug" that many of us have noticed — the one that causes the program to crash, or freeze, when you try to climb into the barrel. He points out that in order to climb into the barrel, the adventurer will probably have taken it beforehand. And you cannot, logically, be in something if you are also carrying it — so the computer locks up.

Finally, while talking of barrels, Blair says: "We see so much today about graphic adventures — and I would argue that this trend has been largely instigated by *The Hobbit*. Some of the serious adventurers among us wonder whether this is a good thing? When I first bought *The Hobbit*, I was impressed by the very good graphics, but the novelty soon wears off and the pictures begin to spoil the game by ruining one's own conceptions, which can be exceptionally vivid. I remember reading that each picture takes up approximately 500 bytes and there are at least 20 pictures. In this 10K of space, *The Hobbit* could have had many more locations, such as the eagles eyrie, and characters."

I'm in two minds about this subject — I love the pictures of *The Hobbit* and, as they are based on Tolkien's original illustrations, they are from the horse's mouth! However, it does get a bit annoying when, for the thousandth time, the goblin's dungeon is S-L-O-W-L-Y drawn. The Mysterious Adventures from Channel 8 (which I can recommend as good text adventures) contain superb Hobbit-like graphics. But, ■ a key-press, they can be turned off until called back. In fact, in order to see what objects are at the location, the picture has to be wiped from the screen, which will then reveal the information.

I don't know if *The Hobbit*, beloved though it is of us adventurers in the UK, "largely instigated" the current vogue for graphics in text adventures. After all, the Spectrum, let alone *The Hobbit*, has made little impression in the States so far.

From Southern Lapland, Gunnar Thander writes: "I am glad to say that the first adventure I bought was *The Hobbit*. This definitely made me mad (a micro-adventurer). Have you ever thought about the importance of trying a good, and I mean good, adventure the first time. I think 'old' adventurers really should try to show 'beginners' the good adventures."

We, the Grand Elf and I, try our best in this column, Gunnar, to bring you up to date with new adventures, and also (and very importantly), ■ retain interest in the old favourites . . . and don't forget to keep an eye on the *New Releases* spot, where Graham Taylor will advise you on the latest programs.

Gunnar continues: "Being non-English, every time I begin a new adventure, I actually face two adventures. The first is the program itself, the second one is the English language!"

Gunnar and his two sons have finally completed *The Hobbit*. ■ the Thander household ■ feeling a ■ lost and wondering what to try now, there ■ *Valhalla* awaiting them. As I write, this program is number one in the sofware best-seller charts and Legend, its authors, claim that the adventure will have done one million pounds worth of business by Christmas, which is very well deserved. I'll be looking in more detail at this program later, but for now, it is gratifying to see that this stunning adventure is getting recognition.

While on this subject, let me move on to a letter I have received from George Wells, of Raynes Park in London. George is 69 (which must make him eligible for a senior adventurer award!). He rescued a Spectrum from his daughter, who was about to throw the thing out of a window. George doesn't say which adventure she was playing, but he has now given it a diet of *Valhalla* which it seems to like very much: "I never cease to admire and wonder at the programmer's skill . . . I also play *The Hobbit*, but, for me, it cannot hold a candle against *Valhalla*. Like the Grand Elf, and Graham (*New Releases*) Taylor, George has noticed that the program has a unique reaction to the casual swear-word! He finishes: "At 69 I must be in my second childhood. I once started *Valhalla* at 11.30 am and finished at 1 am the following morning." I hope you have many more happy hours with this wonderful adventure, George!

**The Hobbit Hall of Fame**

*Steve Redhead* (I do mention *Golden Apple*, Steve, and I agree, it is very good), *Wayne Greaves*, *Kevin Marsh* and *Peter Bywater*, who says that he managed it despite not being one of those unfortunates who can go round *Manic Miner* 20 times before the program has loaded, or thrash the life out of *Orbiter* with the telly off! I know how you feel, Peter — even after reading all the letters in *Popular Computing Weekly* about how to beat *Manic Miner* and the others (what is the point, then, ■ playing them, I wonder), I still can't get past Eugene!

Incidentally, Peter, your observations about the various objects such as the golden key, the curious map and so on, are a little off target. You'll find the adventure harder to complete without them.

*J Pearson* with 92.5 percent (and, no you are certainly not the only one to have bought *Valhalla*), *Mike Docherty*, *Alan and Daphne Davis*, *Daniel Pitcher*, *Stuart Wedgwood* (who has also scored a magnificent 400 points in Crystal's fantastic *Halls of the Things*) and finally *Jason Turtle* who has completed *The Hobbit* in four moves!

To finish this week, a couple of pleas for help in Acornsoft's *Castle of Riddles*. Mark Richards, with a grand score of four, would like to know how to progress past the wishing well, having met the bear, seen the mirror, and the blood-sucking creature. Also, what does *G.L.O.O.P.* mean? Are these the letters on the wall of the corridor of doom, Mark? If so, try going *Up* from the courtyard, standing in front of the safe, and *Saying* the word. You could also try getting the bucket from the well (and persevere, it may not come up the first time).

Andrew Goodall is also stuck in *Castle of Riddles*, at the top of the pinnacle after the shooting gallery. Is there a magic word, or does he need a rope? He is also stuck ■ Digital Fantasia's *Time Machine* — how can he get out of the secret room underneath the desert?

In the near future I hope to be looking at some very interesting adventures that come, like *The Hobbit*, complete with novels. ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

# DRAGON 32

NEW!

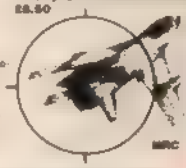
**MRC**
*Air combat and ground strike. "Joystick" controlled sights cannon fire and bomb release. Full colour Hi-res graphics, 3D and sound* **£6.50**

**Fruit**
*Compulsive, addictive, fruit machine. Using your skill with the holds, turn your £5 stake into £10 and beat the system. Hi-res graphics and sound* **£4.95**

**Look and Learn**
*Educational picture recognition hi-res graphics, text and colour. Age 3-10yrs* **£4.95**

**Pontoon**
*Super Hi-res graphics, full colour definition and card display. Fascinating, absorbing* **£4.95**

**Tanzo Foxtrot 01**
*Using your skill locate the aerial with the radar scanner fly your aircraft through hazardous crosswinds and air pockets to land safely. Watch your fuel, watch your artificial horizon, be sure you are level on final approach. Full colour Hi-res graphics, 3D and sound* **£6.50**



MRC

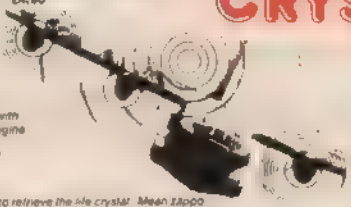
**Missile Command**
*City defence from attacking missiles, progressively difficult. Arcade type. Joystick.* **£4.95**

**Graphics Demonstrator**
*3D rotation, drawing with joystick, approx. 50 examples of Dragon's impressive graphics.* **£4.95**

# SPACE CRYSTAL

**Space Crystal**
*Space trading adventure game. Fascinating 3D space travel on your voyage for the Illudium crystal. Black holes, hyper-drive, gamble planets and space pirates. Full colour and sound.* **£8.95**

# ORIC 1



**Flight Simulator**
*With airspeed, radar, ground/vertical flight path indicators, artificial horizon and altimeter with continuous flight monitor on engine condition, stall speed etc., full colour. Hi-res graphics, 3D and sound* **£6.95**

**Meanster**
*Defeat the guardians of Hyper to retrieve the life crystal. Mean Lappo firing gremlins have orders to blast you on sight. Progressively difficult. Arcade type original* **£6.95**

**Quark 3 D Invaders**
*Superb update of original arcade game, pushes oric to its limits. Full colour and sound.* **£6.95.**

**Super Fruit**
*Excellent graphics and definition fruit machine. Full colour and sound, holds etc* **£6.95**

FOR COMMODORE 64K DRAGON 32K ORIC 48K AND SPECTRUM 48K

QUARK DATA P.O. BOX 61, Swindon, Wilts. Tel. (0793) 40661.
Please supply .....
Prices incl. p&p. UK only.
Cheque for total amount enclosed .....
Name .....
Address .....
.....

Home Computer Centre

29 Millcroft, Crosby, Liverpool L23 9XJ
Tel: 051-727 8050

VIC 20 and CBM 64 are reg'd trade marks Commodore Business Machines

- VIC 20 16K STANDARD RAM PACK – £27.95
- VIC 20 16K SWITCHABLE RAM PACK – £35.95
- VIC 20 32K SWITCHABLE RAM PACK – £49.95

**16K STANDARD £27.95**

**ALL RAM PACKS CARRY 12 MONTHS GUARANTEE**

- VIC 20 4 SLOT SWITCHABLE MOTHERBOARD – £28.95
- CBM 64 4 SLOT SWITCHABLE MOTHERBOARD – £29.95

ASTERFRET TRADING LTD. INCORPORATES HOME COMPUTER CENTRE.

Please allow up to 21 days for delivery. All prices include V.A.T., postage and packing.

If you wish to be added to our mailing list, please tick the appropriate box

☐ VIC 20 ☐ Dragon 32
☐ CMB 64 ☐ TI99/4
☐ BBC ☐ ZX Spectrum
☐ Lynx ☐ Electron
☐ Oric ☐ Colour Genie

**PLEASE SEND ME**

Qty
☐ 16K Std. Ram Pack
☐ 16K Switchable Ram Pack
☐ 32K Switchable Ram Pack
☐ VIC 20 4 Slot Motherboard
☐ CBM 64 4 Slot Motherboard

Name _____
Address _____
_____
_____

I enclose Cheque/PO for £ _____

Home Computer Centre

PCW

# PEEK & POKE

## LIGHT CONTROL

*B A Cummins of Clonmacnoise Road, Crumlin, Dublin, writes:*

**Q I own a Vic20 and would like to control lights, etc, through it. How is this done and is there a book on the subject?**

A This can be done, but you will need a relay of some sort. The Vic will not have enough power to drive a mains relay directly, which means that you will have to use a transistor-driven relay to cope with the low voltage. If you want to use a static relay from the mains, then you will have to take care to isolate the extra mains power supply that would be needed.

As far as I know, there are only two books on the subject, *20 Simple Electronic Projects for the ZX81, Spectrum and other Computers* by Stephen Adams, which is heavily orientated to the Sinclair computers, but it carries a lot of useful general information, and *Simple Interfacing Projects* by Owen Bishop, which is more comprehensive and is not tied to a particular computer, but is more difficult to understand.

## ASCII AND ANSI

*Ian Carleton of St Leonards Hill, Windsor, writes:*

**Q I am new to computing and am getting my first computer for Christmas (an Acorn Electron). What is the difference between Ascii and Ansi? Does the Electron have them and does it need them?**

**I do not know if you have answered this before, but I have seen the words a lot and would like to know because they seem important.**

A The Electron has Ascii but not Ansi. Ascii stands for *American Standard Code for Information Interchange*. It is an agreed way of coding the main characters that a computer uses. Thus, a capital letter *A* has a code of 65 whether it is used on an Electron, Commodore 64, Spectrum, or any of the other common computers.

Although most computers augment the standard by adding their own characters to other code numbers, the main numbers and symbols remain the same. This is very important when it comes to enabling two computers to talk to each other.

Ansi is slightly different. It stands for *American National Standards Institute* and is a dialect of Basic. The Electron does not use this dialect, instead it uses a similar one to the common Microsoft Basic. Microsoft is used on the Commodore, Dragon and Oric, to name but a few.

## DEDICATED UNIT

*H Jenkins of Salford writes:*

**Q What is the difference between a monitor and a television?**

A Essentially, the difference is that one is a dedicated unit and the other is not. A television was not made specifically to receive a signal from a computer — therefore, it contains a lot of circuitry for the decoding and presenting of pictures that have been transmitted over the air. Thus, any signal going into the set via the aerial socket is processed electronically and decoded before it comes on to the screen. All very necessary for a broadcast signal, but equally unnecessary for the signal produced by a computer.

The modulator has to turn the video output from the computer into UHF, so that it can be sent into the television, via the aerial socket. All this electronic manipulation of the signal, causes interference, resulting in a loss of clarity.

A monitor does not have any of the circuitry for decoding television signals. As long as the computer has the correct output, usually RGB (Red Green Blue) or composite video, then the monitor will accept this. With less electronic processing, there is a clearer signal.

## BLACK AND GREEN

*Lee Millset of Paradie Street, Warwick, writes:*

**Q I have recently purchased a Vic. It suits my needs very well, except when using the colour black in large blocks or as a screen border colour. In the case of large blocks, the screen distorts in the middle. When using black as a screen colour, the tv flickers uncontrollably and even fiddling with the tuning does not help. I have to turn off the computer to restore the picture.**

**Could you tell me if this is a computer fault? It works perfectly with a mono set.**

*B P Knox of Garden Way, Littlesborough, Lancs, also writes:*

**I own a Vic20, unexpanded, and it is faulty (I used another Vic to check). When using a black border I lose all green characters, which turn white, while cyan and yellow go pale. Can you tell me what is causing this?**

**I have been on to Commodore and they say they have not heard of the problem before.**

A I have met this problem before, though I have never tackled it. I am surprised that Commodore have never met it at all. I have not got a definite answer, but one possible solution was offered to me by Stephen Adams.

Most probably, the problem lies in the Vic (Video Interface Chip), or the associated discreet circuitry. The phasing for the colour green is also the reference phasing for the other colours, so while a different phase means a different colour, it is green from which they take their standard. In addition, black is in fact off — no signal. Therefore, if you are using black and green, you are in effect just switching the colour on and off.

If you have tried retuning your television and failed, then it is probable that there is a small problem in the video circuitry. Usually this would cause no trouble, but when black and green, which are constantly switching the screen display on and off, are used together, then this might well serve to exacerbate any faults.

In Lee's case it would seem as if the problem is that the Vic chip needs to action the Restart because it is going off phase. This happens when you power up. I am afraid that I can offer little help in fault finding, particularly if the problem comes from within the Vic chip itself.

I am afraid that all I can say is return your computer if it is still under guarantee.

## WHAT IS A RADIAN?

*David Grennel of Banbury, Oxfordshire, writes:*

**Q I have a Spectrum, but the question I want to ask is not about the Spectrum in particular. I would like to know what a radian is. Never a whizz at maths, I do, however, know a little bit about geometry, but I am sure I never met radians.**

**Could you explain — is it a set number of degrees or is it a fraction of pi?**

A Radians can be expressed in terms of pi, but this is not the way a radian is established. There is a clue in the name, radian and the source, radius. In formal terms, a radian is 'the angle subtended at the middle of the circle, by an arc the length of a radius of that circle'.

Imagine a circle of two centimetres, draw the radius. From where it reaches the edge of the circle draw an arc the length of the radius, in this case 2cm. From there draw a second radius. The angle made by these two is one radian.

**Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.**

# VIDEO GALAXY

*FOR THE BEST SOFTWARE*

**OVER 750 PROGRAMS IN STOCK**
**OVER 100 BOOKS IN STOCK**
*PLUS OTHER ACCESSORIES*

**SPECIAL OFFER . . .**

## DRAGON 32 £159.95

**VIDEO GALAXY**
**293 CHISWICK HIGH ROAD**
**LONDON W4 4HH**

## POPULAR COMPUTING WEEKLY NEEDS HELP

Is there anyone out there with Dbase II on a Sirius?

We are looking for someone to write some DBase II routines to help with the administration of *Popular Computing Weekly*. Our own machines are used constantly so you must be able to follow a brief and work on your own.

**If you are interested in the work, and money, call Duncan Scot, Popular Computing Weekly, on 01-437 4343.**



**ZX81, SPECTRUM, DRAGON BBC AND VIC**

## SOFTWARE LENDING LIBRARY

We have for hire from **50p** (including postage) programs for your computer.

**£5** for life membership (less than the cost of a single game) brings you the Software Lending Library membership kit including catalogue, newsletter.

All tapes lent with full manufacturer's permission.

Send a cheque or postal order for **£5** to **Software Lending Library**, PO Box 3, Castleford, West Yorks stating name, address, and computer type.



# *ASTROLOGY*

Wide range of Self-teaching and Accurate Calculation Programs for many machines including:

**48K Spectrum, BBC, Commodore 64**
**Dragon, 16K ZX81, Sharp MZ80A**
**NewBrain, Tandy, Genie, PET**

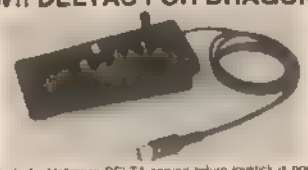
*Please send **large** SAE to:*

## ASTROCALC

**67 Peascroft Road, Hemel Hempstead**
**Herts HP3 8ER. Tel: 0442 51809**



**NOW!! DELTAS FOR DRAGONS**



The smooth control of a Voltmace DELTA sprung return joystick is now available to Dragon owners. Called the DELTA 3D it is a cut down version of our DELTA 14B handset. The same robust ball and socket jointed joystick but with the keypad blanked off to leave a choice of one of three fire buttons.

**DELTA 3D joystick** ..... **£10.00 each or £18.50 per pair**

Seven-day money back guarantee if not satisfied
Price includes p&p and VAT
**VOLTMACE LTD, PARK DRIVE, BALDOCK, HERTS**
**TEL: 0462 894410**
Made in England. Callers welcome at the factory — Monday to Friday.
Trade terms available.

VISA



***NEW GAMES FROM ALGRAY, GRAND MASTERS OF***
## *SPECTRUM*

**THE EXTERMINATOR 16K/48K . . . £5.50 (inc VAT, P&P)**
A 2-stage machine code, fast action arcade style game. 1 — first kill the birds (if you can); 2 — then collect the eggs — the two robot guards are very quick!!!

**TERRY'S TRAVELS 48K . . . £5.50 (inc VAT, P&P)**
A 4-stage machine code, fast action arcade style game. Terry the Terrapin's task is to cross busy roads and fast-flowing rivers and then escape the maze. However, the four Terrapin Catchers in the maze wish to take Terry to the pie factory. CAN YOU HELP??

## AHED HOUSE

**DEWSBURY ROAD, OSSETT, W. YORKS**
**Also games for Dragon 32. Dealer Enquiries welcome.**



# DATA DUPLICATION AT ITS BEST FOR THE TOTAL PACKAGE

***CONTACT:***

VICTORY SILVER PRODUCTIONS LTD.,
22 COURT ROAD INDUSTRIAL ESTATE,
CWMBRAN, GWENT. Tel: 06333 72327/8

# CLASSIFIED

Semi-display — £5 per single cc
Lineage — 20p per word

**CALL *DIANE DAVIS* ON *01-437 4343* FOR SEMI/DISPLAY ADVERTISING**

## GAMES SOFTWARE

### LYNX SOFTWARE

**THE WORM** Our best yet! Guide Wilberforce to the flowers without mishap. You will not want to stop! £5.95.
**REVERSAL3** Our version of popular board game Reversi in fast machine code. £4.75.
**LABYRINTH** — 3D Maze game. £4.75.
**CHANCELLOR** — Run the UK economy for 10 years. £4.75.
**SPACE TREK** - Zap the Klingons! £4.75.
**DISASSEMBLER** — Examine machine code programs in standard Z-80 mnemonics. £4.75.
(Add 10% for overseas orders)

Cheque/PO to
**QUAZAR COMPUTING, Dept. PCW,**
**57 Enfield Drive, East Grinstead, Sussex.**
Other programs available — send for details.
Dealer enquiries welcome

### Softcell presents Bomber Run for CBM 64

Les Allan's Star Game with interrupt based machine code for fast, smooth action. Features include Hall of Fame, five skill levels, demo mode.

**£4.95 including p&p.**

**Softcell,**
**26 Atherosse Drive, Newport,**
**Isle of Wight, PO30 2LJ.**

**Cheques and POs. Enquiries.**
**Tel: 0983 528737 or 0983 290088**

**SYPHAX FOR 48K SPECTRUM.** 100 different screens of jokes, quizzes, puzzles, British and world information, conversion charts, programming aids etc. For the whole family. Adaptable for your own use. £3.50 including p&p. Rosetta Software, 2 Rosetta Close, Wivenhoe, Essex.

**ATARI GAMES CARTRIDGES**
**SPECIAL OFFER £15 each post paid.**
Asteroids ET Raiders Ⅲ the Lost Ark Missile Command, Maze Craze Warlords, Berzerk, Video Pinball and Night Rider.
Cheque/PO payable to **ETS Wholesale, 47 Crathmead Drive, Milnrow, Rochdale OL16 3UE.**

### GAMES SOFTWARE
**SPECTRUM PROGRAMS**

| | |
|---|---|
| BACKGAMMON | £5.95 |
| 3D VORTE | £5.95 |
| IQ TEST | £5.00 |
| HEATHROW | £7.95 |
| NIGHT FLITE | £5.95 |
| INVADERS | £4.95 |
| ESCAPE | £4.95 |
| HOME BUDGET | £5.00 |

Many others. SAE for list.
Prices including P&P.
Cheque/POs crossed, payable to:

**VYAJY'S H-K**
**11 MARGARET AVENUE,**
**ST AUSTELL, CORNWALL**

**SIGMASOFT.** Killer snake for unexpanded Vic20. Eat insects with rapidly growing snake. Avoid mushrooms. Hi-scores, 10 levels. Fast hi-res multicolour graphics. Send £5 inc. p&p to R. Ball, 160 Kiln Lane, St. Helens, Merseyside.

### SPECTRUM DISCOUNT GAMES

| | |
|---|---|
| Manic Miner | £5.41 |
| Invasion of Body Snatchers | £5.46 |
| Hunter Killer | £5.49 |
| The Pyramid | £4.99 |
| Valhalla | £12.45 |
| Kong | £5.10 |
| Home Budget | £5.75 |
| Hobbit for Spectrum, Commodore 64, Dric and BBC | £12.49 |

**FLOWCHART Ltd**
**62 High Street, Irthlingborough,**
**Northants NN9 5TN**
**Phone 09336-50073**
**or SAE for lists stating computer.**
**Prices include post, packing and VAT**

FOR THE DRAGON 32
MOVIE SPECIAL OFFER
PRODUCER £6.95
New Original Game
Can you survive the movie business?
With 3D packaging and free red/green glasses
CHEQUE/P O to ED 90, 249 HIGH ST, STRATFORD, LONDON E15 2LS

**ORIC GAMES.** Five fantastic games on one cassette, we dare you to play! Only £4.99 including p&p. System Software, Ⅲ Otter Way, Eaton Socon, Cambs.

### £500 SPLAT!
**HI-SCORE COMPETITION-CURRENT HIGH**
**James Tant 61195 points**
(Subject to Competition Rules)
SPLAT THE 48K SPECTRUM CHALLENGE AVAILABLE NOW £5.50 INCLUSIVE
**INCENTIVE, 54 LONDON STREET, READING RG1 4SQ**

### SPECTRUM 48K CHRISTMAS EVE

A fabulous feast of frantic festive fun. Multi-screen game with colourful fast-moving machine code graphics.

**Send cheque/PO for £3.95 (UK only) to: Calisto, 86 Wenlock Road, Frinton-on-Sea, Essex**
*Overseas please add 50p to cover postage*

**16/48K SPECTRUM.** "Raquel" presents her game for age Ⅲ and over only (state age with order). Still only £3.50. I Brooks, 17 Malvern, Coleman Street, Southend, Essex.

### FOOTBALL POOLS PREDICTOR

**For 16K ZX-81**
Up to six methods of prediction. Enter matches played and draws. Program Ⅲ in order of preference. Works on British and Australian results. only £4.95
**Matrix Software**, 36 Yardley Wood Road, Moseley, Birmingham B13 8JB

**ORIGINAL SPECTRUM SOFTWARE.** 35 well-known games including Timegate, Penetrator, Jetpac, worth £185, will sell for £85. Tel 0621-815533

**COMMODORE 64 & 8K/16K VIC20.** Soccerclub Boss, 68 teams, divisional scoreboard, commentary, promotion, relegation and more. £2.99 (also on 48K Spectrum) D Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

**VH SOFT COMPUTER SERVICES**
**THE FRIENDLIEST SOFTWARE AROUND**
**— SPECTRUM OWNERS —**
*** SPECIAL OFFER ***
BUY ONE * GET ONE FREE *
— YOUR CHOICE —
EACH TAPE COSTS £5 Ⅲ inc P&P
**SUPER SNOOKER**
Skill and judgement needed here
For 1 or 2 players
**LORD OF THE UNDER WORLD**
A deep and difficult adventure
You'll need nerves of steel
**HOUSE OF CARDS**
You build — the computer knocks down
You'll need patience for this
**SEMAPHORE TUTOR**
Teaches a useful language
and there's a word game to play
**DON'T DELAY — SEND TODAY**
**3 MORETON WAY, MOTTRAM, HYDE**
**CHESHIRE SK14 6AS**

**UNLIMITED SCORES ON MATRIX!** (Vic20, CBM 64) Experience all 20 levels by sending SAE plus 50p Ⅲ Cairngorm, Roke Lane, Witley, Godalming, Surrey.

**LOVE QUIZ.** For courting and married couples. £3.50. Specgames: five games for all the family. £2.50. Both for 48K Spectrum from Mr K. Burton, 8 Westbourne Terrace, Barnsley, South Yorks.

### Labyrinth of the Snappers
**FOR ANY ORIC 1**
The Snappers (Dwarfs mutated by radiation) are about to seize London. You must enter the sewers to find The Orb of Zifron whilst fighting them with weapons and spells you find in the many chests Ⅲ warned, Ⅲ giant flea lurks in Ⅲ darkness! Incredible value at only £4.50 from **P.W. Products, 8 Ravensdale Avenue, Leamington Spa, Warwickshire.**

**Osborne 1 Games and Source code.** 'Doodle' allows easy doodling on screen with option to save or print the screen. 'PBall' is a fast action pinball type game with 10 speeds and high score saved for each speed. Both provided on disc in both Basic and compiled version with printout of each. £11 Ⅲ complete. **BlaqoTron Software,** Ⅲ Jackson Road, Oxford OX2 7TR.

## CLASSIFIED ADVERTISING RATES:

**Line by line:** 20p per word, minimum 20 words.

**Semi-display:** £5 per single column centimetre, minimum length 2 cm. (Please supply A/W as PMT. Or supply rough setting instructions.)

**Conditions:** All copy for Classified section must be pre-paid. Cheques and postal orders should arrive at least two weeks before the publication date.

If you wish to discuss your ad, PLEASE RING Diane Davis 01-734 2688.

## Here's my classified ad.

**(Please write your copy in capital letters on the lines below.)**

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | Please continue on a separate sheet of paper |

I make this ..... words, at ..... per word so I owe you £ .....

**Name** .....

**Address** .....

.....

.....

**Telephone** .....

Please cut out and send this form to: Classified Department, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

## DISCOUNT SOFTWARE

| | R.R.P. | Our price |
|---|---|---|
| Jumping Jack (Imagine) | £5.50 | £4.50 |
| Hobbit (Melbourne) | £14.95 | £11.95 |
| Ant Attack (Quicksilva) | £5.95 | £5.95 |
| Valhalla (Legend) | £14.95 | £12.75 |
| Manic Miner (Bug-Byte) | £5.95 | £4.95 |
| Heathrow (Hewson) | £7.95 | £5.95 |

C.W.O. P&P 55p 1 tape, 2 or more post free. S.A.E. for 9-page catalogue, to: **Discount Software, 45 Brunswick, Bracknell, Berks.**

**ROBOT PANIC** for your 16/48K **SPECTRUM**

Zap the aliens before the walls crush you! Robot Five rooms of escalating intrusion — can you keep up? £5 from retailers (ask) or direct (24-hour dispatch)

**Soft Mill 20 Station Road Haddenham Ely, Cambs CB6 3XD**

**VIC20 GAMES.** Christmas offer from Tournament Software. Two super, highly original tapes for standard Vic: 'Tournament 1' — Automania, Astradodge, Crossover, Trogmen.'Tournament 2' — Headshrinker, Luna, Gypsy Rose Vic, Vicbuz. Outstanding quality. Great sound, colours, hi-res graphics, music, animation. Buy now for Christmas at special offer £7 for both tapes. Each tape alone at £3.95 (inclusive). Tournament Software, 63 Mansion Court Gardens, Thorne, Doncaster, South Yorkshire DN8 5BH. SAE for details.

**DAVID SHACK SOFTWARE**

Over 150 games for the Spectrum and 100 for the Vic20. Also BBC, CBM 64, Dragon, Atari. Software sold at 10% discount

*SAE for lists to:*

**294 ROMFORD ROAD, FOREST GATE, E7**
**Telephone 01-555 8363**

## UTILITIES

**AMAZING VALUE.** Dragon Copycat copies your Basic or M/C programs (including autoran). Send only £4 to D. R. T. Lowe, Waterside, Little Ayton, Middlesbrough, Cleveland.

**FOR VIC20,** Arlan expansion (switchable), MC monitor, programmers aid, Forth, Maths and various games. Tel: 01-869 7108 (after 6 pm)

**SOFTSAVE FOR THE VIC20,** allows you to back-up most software on to a new tape, cassette with instructions, £4.95 from: Softsave, 65 Stonewood, Bean, Nr Dartford, Kent DA2 8BZ.

## SPECTRUM KOPYKAT

**IMPROVED PERFORMANCE**

**Simply the best.** Copying any program is now as easy as LOADing and SAVEing your own programs. **Any ZX Spectrum** program can be backed-up onto a fresh tape. Even programs that cannot be stopped can now be copied. 100 per cent machine code. Copies headerless files. Prints the name. SPECTRUM KOPYKAT uses no program area so full size programs over 41.7K (9K for 16K machines) are easily duplicated. PLUS **FREE** Header Reader program. **Immediate despatch by first class return of post.**

Send cheque/PO for £4.95 to:

**MEDSOFT**
**61 Ardeen Road, Doncaster, DN2 5ER**

***IT CAN EVEN COPY ITSELF***

**SPECTRUM OWNERS**

If you write your own games, the tape is a must. Contains machine code routines to move your objects one pixel at a time guaranteeing fast, smooth and flicker free movement. Gives a professional look to your software. £5.00

**Trebtrend Ltd, c/o Swinton Hotel, Swinton Street, London WC1. Tel: 01-278 2933.**

**SPECTRUM 007 SPY COPIER.** Makes back-up copies of all your tapes, guaranteed easiest to use; guaranteed to copy more types than any other copier. No gimmicks, therefore can copy even a full 16K/48K program. Note: only 007 Spy can also copy tapes to microdrive. Send £3.95 to: ZX Guaranteed, 29 Chadderton Drive, Unsworth, Bury, Lancs. Tel: 061-766 5712.

## ★★ TAPE COPIER ★★

The most advanced BACK UP COPIER for **ANY SPECTRUM** available. **MICRODRIVE COMPATABLE.** Does any other copier come near?

**LOOK** at only SOME of its options.

- Mascopy makes working copies of the full 16K or 48K!
- Verifies. Repeat copies. Automatic abort STOPS programs.
- Loads CONTINUOUSLY (not just one part at a time like most copiers) even without pressing a key.
- Copies HEADERLESS and **ALL** programs that are are aware of!
- Very user friendly and simple to use.

**LISTEN.** We are so convinced that you will be pleased with our product that we offer a **FULL MONEY BACK GUARANTEE** if you are not fully satisfied. Cost only **£4.50.**

**LERM, DEPT PW**
**10 STONEPIT DRIVE, COTTINGHAM**
**MARKET HARBOROUGH, LEICS**

**SPECTRUM TRADE SECRETS,** amazing booklet includes making programs unlistable, unstoppable, invisible. How to list reveal such, etc. Send £3 ZX Guaranteed, 29 Chadderton Drive, Unsworth, Bury, Lancs.

**DRAGON DRAWING PROGRAM** designed by artist, black and white, requires joystick. Drives RX80. Copy of instructions £1.10, cassette £9.50 K. Garwell, 5 Cottage Road, Alsager, Stoke-on-Trent ST7 2SS.

**SPECTRUM MENU OPERATING SYSTEM**

**MENUSYS** is an operating system — a program for running programs. If you write lots of short **BASIC** programs **MENUSYS** is for you. Install up to 15 BASIC progs. then control them with 1 key menu-prompted commands. Pack more action into your **16K** or **48K**. Write short user friendly programs using MENUSYS routines for **mouse control, forms-style data entry** and **inter-program communication**. Even a 10 line program becomes snappy and sophisticated. **Utilities** includes fully programmable **toolkit** (renum, ber, renums etc.) copy back up (save un-finished games in state of play). **MENUSYS** is mostly in BASIC listable, **copyable**, and easily versable and comes with **20 pages** of instructions. Get MENUSYS for Christmas guaranteed to fascinate for at least 12 days. (It's like getting a new computer!)

**MENUSYS for 16 48K SPECTRUM**
only £4.95 inc. tape, post p&p

To receive your MENUSYS p & p by return post send cheque PO for £4.95 to

**Micro Accessories**
**40 Bowling Green Lane**
**London EC1 0ND**

**DRAGON KOPYKAT** on cassette. Makes back-up copies of most machine-code programs — including protected auto-run. £5.95. D. Gill, 82 Carlton Hill, London NW8 0ER.

## COMMODORE 64 OWNERS

Assembler — Disassembler, Machine Code, Programming cassette — **£7.50**
Light Pen Editor — edit Machine Code programs using your Light Pen — **£7.50**
Light Pen Assembler Disassembler — **£7.50**

*PLEASE SEND FOR DETAILS TO:*

**MICRO & VIDEO,**
**3 BEATRICE STREET, LATCHFORD, WARRINGTON, CHESHIRE**

SOFT SAVE FOR THE VIC20

Allows you to back-up most commercially available software or any memory size on to another tape. Cassette with instructions

**£4.95**

**SOFTSAVE, 65 STONEWOOD, BEAN, Nr DARTFORD, KENT DA2 8BZ**

## TALLENT MICRO LYNX

your computer to excellent software.

***MERRY CHRISTMAS!***

**189 New Road**
**Woodston**
**Peterborough PE2 9HA**

for catalogue

**EIGHT-CHANNEL** analogue to digital converter for 16/48K Spectrum. Easily accessed from Basic programs. Send £37.95 to Exeter Electronic Services, 1 Bartholomew Street West, Exeter, Devon.

**SPECTRUM SPEEDYLOAD** — Reduce your waiting time with this short program which lets you save and reload at 3000 baud on a standard cassette recorder. Easy to use with any tape command. Cassette (48K only) — £3.95. Ness Micro Systems, 100 Dradkes Avenue, Inverness IV2 3SD.

**SPECTRUM AUTOKOPY 3**

Take back-up copies of any Spectrum tape. But do not break copyright or conditions of sale.

**NOW MORE POWERFUL THAN EVER**

The most advanced copier yet produced. The only copier really capable of copying programs the full 16K or 48K long. Even copies programs recorded from the bottom of Ram to the top of Ram in one go!

A massive 32k or 64K capability. Copies Basic, machine code, headerless. Auto abort on tape loading error. No protection device too difficult.

**Use Autokopy for programs the other copiers will not copy.**

Backed up by fast friendly service. Your earlier versions updated if you return tape together with 50p.

**Send £3 only to: D. Tidd, 168 Heytlands, Welwyn Garden City, Herts AL7 4RG.**

**SPECTRUM 007 SPY.** Make copies of all your tapes. Basic, bytes, screen and headless. Even copies other copiers. No gimmicks, therefore can copy full 16K/48K. Guaranteed easiest to use. Guaranteed to copy more tapes than any other copier. With free header reader and program to Stop/Study machine code programs. Microdrive compatible. Send £3.95 to ZX GUARANTEED (PCW3), 29 Chadderton Drive, Unsworth, Bury, Lancs (tel: 061-766 5712).

**BREAKER BREAKER**

for the Commodore 64, makes back-up copies of most popular cassette programs. Protect your software investment, £3.95. C.Kent, 26 Northcape Walk, Corby, Northamptonshire.

**SPECTRUM TRADE SECRETS.** Includes making programs unlistable, unstoppable, invisible. How to reveal such programs, etc. £3. ZX-GUARANTEED, 29 Chadderton Drive, Unsworth, Bury, Lancs.

**SPECTRUM** Kopykats microdrive, only 007 Spy includes a program to let you copy machine code tapes on to microdrive. See 007 Spy advert.

## VIC IMITATOR

Copies virtually all Vic20 cassette-based programs, including basic machine code, multipart programs and programs using various protection techniques. Written in machine code. Easy to use, works on any memory size. For a quick delivery, send Cheques/POs for £6 to

**IAN WAITE, Dept. PCW1K,**
**11 Hackenthorpe Road, Sheffield S8 8AU**

**BBC "CLONE-2"**

Tape back-up package — ★ Any O/S ★ Any Basic ★ Files ★ Locked progs. Only £4.00 with free 8-colour Simon game! **M. A. Parks,** 38 Woobum Manor Park, Woobum Green, High Wycombe, Bucks.

## HARDWARE

**COMPUTER DATA RECORDER,** battery/mains, tape meter, £29.90 plus £2 p&p. Dragon on/off indicator. No soldering. Indicates if PSU is on, £3.90 plus 50p p&p. Mail order only. Both include one C12. **J. Swanson,** High Street, Spilsby, Lincs.

**FLOPPY DISC INTERFACE FOR SPECTRUM**

**FDC-1** interface card, with Disc operating system in EPROM, and a Utility disc
£70.00 ex VAT £81.50 inc VAT, P&P

**FDC-1 Mk2** As Mk1 but with a Spectrum edge connector for further Cards, e.g. printer interface
£85.00 ex VAT £98.75 inc VAT, P&P

Centronics interface for Spectrum — £29.00 plus VAT

We also sell disc drives for above interface

Further details available from.

**TECHNOLOGY RESEARCH LTD.,**
**360 Westmount Road, London SE9 1NW.**
**Tel: 01-850 6488**

**CHIPMUNK** for discount hardware, e.g. Commodore 64 £189, Atari 800XL £225. SAE for price list. Chipmunk, Sterling House, 231 Whitby Road, Ellesmere Port, Cheshire L65 6RT.

**LYNX LYNX LYNX**
**COMPLETE KEYBOARD PACKAGE OF A DATA STAND PLUS DATA CARDS**

- Quality DATA STANDS to help in typing or programming
- DATA CARDS contain full keyboard information
- Keyboard entry of user defined graphic characters
- Also a new approach to number conversion

Allow three to four weeks for delivery

Dealers welcome. Cheques & POs only

**£14.95** inc. p&p

**PERIPHERAL PRODUCTS**
209 KENTON LANE, KENTON, MIDDX. Tel: 01-907 3408

**ZX OWNERS**
**BANISH LOADing PROBLEMS**

for only

**£14.99**

## SOFTWARE

**TRY US FOR CBM64 SOFTWARE**

We don't offer discounts but we have a UNIQUE BUY-BACK trade system e.g. MOTOR MANIA (with trade) £4.50. MONOPOLY (with trade) £3.00. Send SAE to **JAYCEE SOFTWARE, FREEPOST (no stamp), FORRES IV36 0BR.**

**BRAG.** Spectrum 48K. Can you outwit your computer at the classic game of bluff? At level three this highly entertaining and original program beats even its own programmer! Only £4.95. Despatch by return. T. Lebon, Little Brays, Brays Lane, Rochford, Essex.

**CHAPMAN AND BECKINGHAM SOFTWARE**

Present for the 16/48K Spectrum

| | |
|---|---|
| REVERSI | £4.00 |
| CUBE SIMULATOR | £4.00 |
| MATHS (5 to 10 years) | £3.50 |
| SQUIRM | £4.00 |
| For the 48K Model | |
| ADVENTURE ONE | £3.50 |

Send cheque/PO to: **12 Little Howe Close, Radley, Abingdon, Oxon OX14 3AJ**

**SPECTRUM SOFTWARE**, sell or swap Valhalla and Black Crystal £6 each. Instruction books lost. Perfect working condition. Tel. 0793 695034.

**SOFTWARE PIRATES!** Get MENUSYS for Christmas! Makes copies of itself at the touch of a key! Only £4.95. See MENUSYS advert.

## EDUCATIONAL SOFTWARE

**SPECTRUM**
TEACHER DATA
MARK PROCESSOR 48K SORT GRAPH, GRADE
*"Genuinely useful"* **£5.20**

**BRIAN FARRIS**
**8 THOMPSON ROAD**
**BOLTON**

**EDUCATION SOFTWARE** for Spectrum 48K. GCE, O/CSE Physics, six programs, £8.50; Chemistry, six programs £8.50 or both tapes, £12. Think Tank, Dept PCW, 35 Wellington Road, Wimbledon Park, London SW19 8EQ.

## FOR HIRE

**TO HIRE A COMPUTER** from ZX81 upwards, ring or write to Business and Computer Services, 292 Caledonian Road, London N1 1BA. Tel. 01-607 0157.

## DEALERS

**SOFT MACHINE**
**OPEN MON-SAT, 10.30-6**

We offer a selection of the Finest Books and Software currently available for: Oric, ZX81, Spectrum, BBC, Dragon, Vic20 and Commodore 64 Microcomputers.

**3 STATION CRESCENT, WESTCOMBE PARK, LONDON SE3.**
**Tel: 01-305 0521**

or send SAE for free Catalogue (State which Computer)

**CONTACT ANGLIA COMPUTER CENTRE** for the Spectrum 16K plus 48K, Vic20, Dragon, Lynx, Vic and Epson HX-20. Tel: (0603) 667-036. (Unbeatable prices.)

## CHRISTMAS SPECIAL OFFERS

**Quickshot Joysticks £8.50**
**Program Data Recorders £23.00**
**C15 Blank Data Cassettes**
for 55p, boxes of ten
**BBC Model B £399.95**
+ Free Tape Recorder

All prices incl. of VAT and P&P. Cheques/POs crossed, payable to Jayson's

**JAYSON'S**
**[illegible] CHESSINGTON AVENUE**
**LONDON N3 3DR**
**Tel: 01-349 3638/2498**
*ANYTIME FOR A 5-STAR SERVICE*
*TRADE ENQUIRIES WELCOME*

**COMMODORE 64 £184**
(Excluding VAT)
Disk drives and cassettes also available
Tel: Floyd Patterson, Tel: 01-969 0812
or send SAE
**Image Science Micro Computers Ltd**
**108 Preston Road, London W18 6TH**
or cheques/POs (add 15% VAT) and £8 for p&p Securicor delivery

Full after-sales maintenance on all Commodore equipment bought from us

**A RETAILER** for Sinclair accessories in the North of England. We are situated near the M1 and M62 motorways. As well as a complete range of hard and software, our service department can repair, modify or fit a wide range of accessories. Hours of business 10 am — 6 pm Tuesday to Saturday inclusive.

**TELEPHONE PHILIP COPLEY ON 0924 272565**
**4 WESTLEY ST, OSSETT, W. YORKS**

**PLEASE RING FOR DETAILS OF OUR MAIL ORDER SERVICE**

## FOR SALE

**DRAGON 32**, only three months old, perfect condition. £110, also Intellivision, unused, plus three cartridges. Offers. Tel. Milton Keynes 72721 days, 70676 evenings.

**48K SPECTRUM + £60 OF SOFTWARE**, including Flight Simulator, Address Manager, Melbourne Draw, and machine code tool and text book — also two other text books + back-dated Sinclair user mags. £100. Tel: Rulshp 38620.

**48K SPECTRUM**, loads of games, books, magazines, only 3 weeks old, as new and packed only £115. Ring 01-794 9655 (after 6 pm).

**16K ZX81** for sale, professional keyboard (cased) + graphics Rom, U.D.G. over £100 software, £140 ono. Tel: Consett (0207) 501439.

**VIC20**, recorder, 16K Ram, joystick, lots of software, good condition, worth £350, will sell for £150 ono. Tel. 01-390 5671 (after 4 pm).

**21K VIC20 C2N** cassette unit, cartridge and cassette games, dust cover, £120 ovno. Tel: (07073) 39541.

**48K SPECTRUM**, printer, carrying case, over £400 of software, 17 originals including Scrabble, books and magazines. £230. Tel. 01-904 4964.

**BBC MODEL B** — 1,205 cassette recorder, joysticks, micronet modem, books and magazines, including £50 worth software. All excellent condition, £350. Tel: Preston (0772) 323148.

**BBC B SOFTWARE**. Leading titles from main software houses. All originals. Very good condition, choose from large list, any three for £12. Tel: Preston (0772) 323148.

## SERVICES

**★ DRAGON TAMERS! ★**
**DO YOUR LATEST MASTERPIECE GIVING YOU A HEADACHE?**
**A Quality Hard-Copy would be the professional approach**
**NO PRINTER — NO PROBLEM!**
Allow us to list your programs
Send £1 per Tape plus 75p per Program. Cheques/POs payable to
**DATAPRINT**
32 Wickham Road, London SE4

**ZX81 — SPECTRUM**
We can now offer out-of-guarantee repairs by our Computer Dept. Our engineers have had over three years' experience servicing Sinclair Computer products. Price including p&p. ZX81 — £11.50. 16K Ram — £9.95. Spectrum — £18.75. Send with cheque or PO. T.V. Service of Cambridge Ltd, French's Road, Cambridge CB4 3NP. Tel: (0223) 311371.

**jbs records**
**COMPUTER PROGRAMS**
REAL-TIME or (Slow) HIGH-SPEED Professional Cassette Duplication and Blanks from 1 to 1,000+. Computer printed Cassette Labels etc. Fast Security Delivery service.
**jbs records — a division of FILTERBOND LTD, 36 Sadlers Way, Hertford SG14 2DZ. 0992 551188**

**SPECTRUM PROGRAMS** required by Turtle Software for guaranteed New Year marketing, good royalties paid, everything considered. Send to Turtle Software, "Wychwood", School Road, Finstock, Oxfordshire. SAE for details.

## RECRUITMENT

**PHOENIX SOFTWARE**

Are looking for Machine-Code Arcade-quality games. We have an idea which could make your game the best seller in Europe.

*Send your program to*
**PHOENIX SOFTWARE**
**Spangles House**
**116 Marsh Road**
**Pinner, Middx.**
**or Tel:**

**01-868 3353**
***NOW!!!***

**AQUARIUS**

BUNCH OF FIVE CASSETTE (Snake, Masterguess, Symon, Bomber, Hi-Lo) ..... **£4.95**
CASSETTE RECORDER LEAD ..... **£1.95**
*SPECIAL OFFER*
*Order both get £1 off total*

**SPECTRUM** Save wear and tear on your power socket with our own RESET SWITCH **£3.95**

PROCESSOR LTD.
A.O.S. House
1 Willow Parade
CRANHAM
Essex RM14 1DZ

*SPECTRUM SPECTRASOUND*
*Audio through your TV*
**£9.00** 80p p&p

**SAE for further details**
**MAIL-ORDER ONLY**

# COMPUTER SWAP COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send it to Computer Swap, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-734 3454.

All software offered through computer swap must be of original condition and for private sale only.

**Warning:** It is illegal to advertise pirated software.

**Please write your copy in capital letters on the lines below.**

| | | | | |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Name**.....

**Address**.....

.....

**Telephone**.....

## MAGAZINES

### DRAGON USER

If you make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £8 for 12 issues or subscribe for two years for £14.40 and receive a free copy of either **The Working Dragon** or **Dragon Gamesmaster** (overseas rates available on application). Send a cheque or postal order made payable to Dragon User and accompanied by your name and address to: Dragon User Subscriptions Department, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH.

## ACCESSORIES

### SPECTRUM DUSTCOVERS Only £1.75 (inc. P&P)

Smart top quality Blue "Galaxy" PVC with silver Spectrum "flash". Unique design permits leads and most interfaces to remain connected.

**PDQ Software, 'Parsley Rye' Hilders Lane, Edenbridge, Kent**

*Dealer enquiries welcome*

**Protect your 5¼in floppy discs** in durable plastic wallets. Each wallet protects up to four discs with highly professional appearance. £1 single wallet inc 60p each for orders of 10 or more. **RhodaTree Software**, 66 Jackson Road, Oxford OX2 7HR.

## CLUBS

### SOFTWARE LIBRARY FOR SPECTRUM AND ZX81 OWNERS

***Why buy a game, when you can have up to seven for the same cost?***

**SPECIAL OFFER:**

The first game you hire absolutely free. Membership fee only £4.50. Cost of hire for seven days — 70p (plus 25p p&p). Send cheque/PO for £4.50 made out to Fifth Dimension Software. We will send you our list covering a wide range of games together with your first three games.

**FIFTH DIMENSION SOFTWARE, 10 MADELEY CLOSE, MARUS BRIDGE, WIGAN, LANCS.**

All tapes used with manufacturers' permission.

**COMMODORE 64 USERS.** Would you like to exchange software in either cassettes or disks? Please write or send programs to David Lee, Wolframstr 1, 6520 Worms, West Germany.

**VIDEO GAME CLUB** by the Spectrum specialists. Phone 01-459 0631 for details of special offer and catalogue of latest software available.

## FOR SALE

**SUPER EXPANDER CARTRIDGE,** Super Lander cartridge and Bug-Byte Vicmen and Asteroids for Vic20. Sell for £40. Tel: (0333) 320834 after 5 pm.

**TI99/4A** for sale, £60 or swap for Spectrum/Vic20. Tel: 01-986 666 (after 6 pm).

**ORIC 1.** Brand new, with £30 of software, guaranteed, £100. Tel: 01-967 4480.

## WANTED

### WANTED

Quality Games and utility programs for any Micro. All programs considered. *Instant cash outs royalties on all programs accepted with a view to distribution in UK, USA and Europe.*

**Dream Software PO Box 64 Basingstoke, Hants RG21 2QB Tel: Basingstoke (0256) 25107**

**AMATEUR/PROFESSIONAL ASTROLOGER** required by publisher for exciting project. If you know what we are after contact Box No. PA1, c/o Popular Computing Weekly, 12/13 Little Newport Street, London WC2R 3LD.

**SUNSHINE**

We are seeking authors to review titles for publication. We are highly original and commercially minded. Experienced and full-time authors only need apply.

Full details of what we require from you: **David Lawrence, Book Editor, Sunshine, 12-13 Little Newport Street, London WC2R 3LD.**

Sunshine: Publishers of Popular Computing Weekly and Dragon User.

### URGENT

We urgently require for a nation-wide retailer, quality Arcade games, for Vic20 and Spectrum machines.

Best prices paid for the right programs.

**RAINBOW RESEARCH 288 HIGH STREET PONDERS END, ENFIELD, MIDDX**

### Computer Swap 01-437 4343

**Free readers entries to buy or sell a computer. Ring 01-437 4343 and give us the details.**

## Spectrums for sale

**SPECTRUM SOFTWARE:** Escape, Jawz, Diddums, Micro Chess, Blind Alley, Desert Patrol, Lunar Rescue, will swap for Vic20 software or £20. J Croskell, 9 Granville Road, Lancaster, Lancs LA1 2PA.

**SPECTRUM SOFTWARE:** VU-3D £6, Spectsound, Zip-Zap £4, Spectres, Battle of Britain, Speakeasy, Aquanus, Games 5 (Star Trek), Mined-out £3, Interceptor Micro Interface £8. Tel: 01-393 3909 (after 6.30 pm).

**SPECTRUM SOFTWARE** for sale, Winged Avenger £2, Ground Attack, 3D Tanx. Tel: Paul on 01-540 8053.

**EPSON MX80 F/T,** dot matrix printer, £250. Tel: Ramsey (0487) 842135.

**SPECTRUM SOFTWARE,** superb condition, all ½ price. Aquaplane, Jumping Jack, Molar Maul, Planet of Death, Escape 3D, Tunnel, 3D Tanx, Fausts Folly. Tel: Dan, Reigate 48554 (after 4 pm).

**SPECTRUM 48K** plus 50 games including Arcadia, Spookyman, Cosmos, Light Cycles, Jetpac etc, all latest games including games designer, £165 ono. Tel: Bedford 61069.

**SPECTRUM 48K** with Kempstone joystick, interface and 12 games including Hobbit, Trans-Am, Manic Miner, Transylvania Tower, Horace Goes Skiing and more with cassette player, only £110. Poole 0202 685423.

**LOOK!** Spectrum software, Golden Apple £4, Jumping Jack £3.50, Ah Diddums £3.50, Planet of Death £3.50, Pimania £5, Over the Spectrum (book), £4. May swap. Tel: 01-472 4165, ask for Trevor.

**48K SPECTRUM,** printer, many games including Hobbit, Zoom, many more, tape recorder, computer consul, many books and magazines, £185 or swap for Commodore 64 plus tape recorder. Tel: 01-304 1333.

**SPECTRUM** joystick, interface £5. Tel: Stevenage (0438) 811834 after 7 pm.

**ZX SPECTRUM TAPES** for sale, Hungry Horace, Horace Goes Skiing, Horace and the Spiders, Planet of Death, Inca Curse, £2.50 each or £10 for all. Tel: Worthing (0903) 211439.

**SPECTRUM SOFTWARE.** All perfect originals including Scrabble, Flight Simulation, QS Chess, Inca Curse, Golden Apple, Monopoly, Magic Mountain, Pharoah's Tomb, M Coder. All half price plus postage. Tel: Rugby 73594 evenings.

**SPECTRUM SOFTWARE** and books for sale, 20 tapes in all, £60 ono or swap for CBM 64 software. Tel: Uxbridge 55497 after 6 pm.

**48K SPECTRUM,** £70 software and £180 of good condition Lego. A very large and up to date collection. Swap for quite new BBC Model B. Tel: Burgess Hill 2760 after 5.30 pm.

**48K SPECTRUM,** ZX printer, five rolls of printer paper (with manuals and boxes), three machine code books (Z80), software including assembler, £170. Tel: Southend 586841.

**80K SPECTRUM,** printer, Kempston joystick, eight professional cassettes, 20+ magazines, five books, secunioor delivery, worth over £300. Great Christmas present at only £199 plus p&p. Must go soon! Tel: 03302 2505.

## Ataris for sale

**ATARI VCS,** good condition, 6 cartridges, £99. Tel: 01-935 9687.

**VIC20** with 8K stack storeboard, also Vic82 software, including Vic Panic and O Level Revision programs for physics and English, 2 cartridges with Segon 2 Chess and Superlander, £190. Tel: 051-722 3735.

**VIC20,** C2N, joystick, four cartridges, £100. Tel: 01-935 9887.

**ATARI 400 48K** including Basic cartridge and manuals, 410 recorder, pair of joysticks and approximately £100 of software including Star Raiders and Soccer, £175 ono. Tel: Huddersfield (0484) 663336.

**ATARI VCS** with 6 cartridges including Star Master, Asteroids + Space Invaders, £90 or swap for Spectrum. Tel: 01-303 5384 (after 6 pm).

**ATARI 400 16K** with 2 joysticks + cassette recorder with £150 of software, sell for £200. Tel: 01-673 6782, Mr Chan.

**ATARI 400 16K,** Basic cartridge + manuals, lots of software and Atari joystick, great Christmas present, £110. Tel: 04446 41196.

**ATARI 400 48K,** recorder + £150 of software, joystick as new, one year guarantee, only £250. Tel: 01-550 0606 or swap for BBC B (after 6 pm).

**ATARI 400 16K** + 410 tape recorder, joystick, Basic + £200 of software, sell for £130 ono. Tel: 01-840 5278.

## Wanted

**SWAP PIRATE COVE** for any other in series except adventureland, will sell colour tv game for £10. Tel: Hamilton 0698421 327.

**VIC20,** Adventureland cartridge, will swap for any other Scott Adams adventure cartridge. Phone Huddersfield (0484) 21532, before 6 pm.

**WANTED** C2N cassette recorder for Vic20 + Ram unit. Tel: 0424-224667.

**48K SPECTRUM SOFTWARE** to swap, especially interested in Educational programs. Tel: 01-595 4923.

**SPECTRUM HANDBOOK,** Kempston joystick, interface, VU-File, Arcadia, "Dragon-32 and how to make most of", Dragon Mountain, Personal Finance, and 8 games in one, swap for anything VIC-20 or offers. 5 Worthington Close, Runcorn, Cheshire.

**SWAP** Atari VCS cartridges for other cartridges. Raiders, Lost Ark or Amidar for Yars Revenge, also Berzerk, Phoenix, Demon Attack, plus 10 other top games. Phone Leeds 867922 (evenings).

**SWAP** Vic20, boxed, excellent condition, cassette deck + £140 of software + 8K Ram + joystick for 48K Spectrum with software + joystick, interface. Tel: Buckley 546343 (after 6 pm).

**SWAP** Oric-1 48K, cassette player, £50 software, printer voucher, all new, worth £250, plus cash for Atari 800 or Commodore 64 or offers around £140. Tel: Andrew, Mellon Mowbray 60281.

**SPECTRUM 48K WANTED,** issue 2 preferred. Please phone "Mac" on 0742-668955 (Sheffield).

**WILL SWAP** my Intellivision + up to 10 cartridges for a 48K Spectrum. Tel: 0482 210629.

## Acorns for sale

**BBC MODEL A 32K,** will run any software, can be upgraded cheaply to a full model B. £220. Tel: Hamilton (0698) 428438.

**ACORN ATOM 12K + 12K + SP,** complete with leads + manual, £120 of Acorn software, £140. Tel: 0480 76397.

**BBC MODEL B HIGH QUALITY SOFTWARE,** Fruit Machine — features hold, nudge, gamble, collect, killer line and code-break, all for only £3.70 (tape), £5.00 (disc). Rebelsoft, 19 Trelawney Road, Saltash, Cornwall PL12 4DB.

**ACORN ATOM 12K/12K,** toolbox, Rom, Eagle PSU, Bug-Byte "747", "Chess", "Invaders", Acornsoft "Pasko-Computer", 3 books, only £100 ono. Tel: (0202) 482781.

**DISK INTERFACE** for BBC micro with full fixing instructions, at present fitted to issue 3 board, for £55. Tel: 01-202 6410 after 6 pm.

## For sale

**BUSINESS COMPUTER.** Ideal for small business, consists of I.M.S. 5000, 48K to 128K, three-disk drive, remote terminal (monitor keyboard and numeric keyboard), software available. £1,100 ono. Tel: Dorking 731 114.

**TRS80,** 16K, good condition plus manual and leads, cassette, recorder, books plus over £130 software, £200. Tel: Newcastle upon Tyne 09128 59440 after 5 pm.

**PRINTER.** Dot-matrix, plain paper friction feed printer, uses standard typewriter ribbons, cost over £500. Perfect order, accept £125 ono, including free Pet/CBM interface and paper and leads, etc. Tel: Chester 675717.

**MOREX PRINTER INTERFACE,** as new, with manual and software (Tasword), £40 ono. Tel: 434-2074 after 1 pm. (Six months guarantee).

**FOR SALE.** More than 20 original Spectrum tapes. All in excellent condition includes all 16K Imagines, Quicksilva, etc. All half price. Tel: (0723) 64592 between 5 pm and 7 pm only. (Private sale).

**SWAP OR SELL** TI99-4A + joysticks + cartridge + software for £120 or will swap for Oric I with or without software. Tel: Hornchurch 57487 after 5 pm.

**VIDEO GENIE**, 16K Ram, integral cassette + documentation, utilities, £50 ono; Printer Interface, £20; Centronics 779 printer, £100. Tel: 01-670 5448 evenings

**NEW BRAIN AD**, complete with leads + manual + Reno tape + info, good machine, very good condition, quick sale needed, £160. Tel: 0452 67725 after 6 pm

**TEXAS INSTRUMENTS** TI59 calculator, hardly used, with master library Rom + 30 magnetic cards, complete with box, manuals + 3 s/w books, converter to TI program calculation, only £90. Tel: 0532 561 811

**SHARP MZ 80K**, as new, full literature + 10 tapes, £250 ono. Farnborough, Kent. 51863.

**TEXAS INSTRUMENTS** TI99/4A, extended basic language + Atari joystick, interface + books, manuals + programs, 8 months old. Today's price £210, sell for £105 ono. Tel: G Crawshaw, High Wycombe 27807.

**SEIKOSHA GP250X**, 5 months old, with leads for BBC, £225. Tel: 01-575 1676 evenings

**EPROM HX20**, 16K + extra leads, manual + printer paper inc carrying case. Will sell for £400 Tel: 04862 54033.

**SHARP MZ80 P3 PRINTER** + interface card + Apollo word processor programs, £315 ono Tel: Langport (0458) 250130, Mr J. Chuter

**SHARP MZ80K**, built-in screen + tape-recorder, basic tape, £250 o/s/w, manual + ref guide, dust cover, £285 Tel 01-455 6641 after 4 15 pm

**AMBEC PRINTER**, 1 month old, suitable Dragon or BBC, £65 APPLY TO NOBODY.

**YOU CAN BE THE** proud owner of an MZ-80K (48K) computer (monitor/cassette plus software, etc ) for cost £200! or swap for CBM 1541 disk drive. Tel: Cardiff 732955 after 5 pm.

**ORIGINAL TAPES INCA CURSE** £5, Arcadia £3 50, Space Intruders £2, 3D Tunnel £4, Centibug £2.50, 3D Tanx £2.50, The Hobbit £7, Zoom £4. All excellent condition. Will send. Tel: 021-742 7906

**ATARI VCS**, paddles, joysticks, dust cover, nine cartridges including Chopper Command, Pac-Man, Asteroids, Berserk, Space Invaders and Night Driver, all in perfect condition, worth £250, bargain £160 ono. Tel: Southend 232420

**ATARI 400 48K BASIC RECORDER** and manuals, also £1,000+ of software including Pole Position, Blue Maze, Miss Pac-Man, £175 ono. Tel: 0906 75094.

**ATARI VCS** with Pit Fall, Combat, Space Invaders, Asteroids, Phi Onx, two joysticks, pair of paddles, all boxed, very good condition, hardly used, cost £180, will sell for £95. Tel: Mrs E Riley, 500 7736.

**VIC20** + 8K Ram + cassette deck + £40 games + books and magazines + 10 blank tapes, £130 in total. Tel: Gary, Cookstown (06487) 63712, after 4 pm.

**VCS ATARI CARTRIDGES**, between £8 and £10 each, titles include Space Invaders, Empire Strikes Back, Pac-Man, 55 titles in all. Tel: Bicester 242408, between 5 pm and 8 pm.

**TI99/4a COMPUTER** plus Extended Basic and Tombstone City. Over ten cassettes and cassette cable. Very good condition, ideal for Christmas. Tel: Edward on 570 3131 after 4 pm

**TEXAS TI99/4a**, joysticks, three cartridges: Parsec, Connect Four and Invaders. Eight cassette games, beginners Basic tutor, dual cassette lead. All still guaranteed, in good condition, £150 ono. Tel: Egham 35853

**TELETYPE KSR 33**, ideal cheap printer. Manual and stand, £50. Could deliver London/Oxford area. Tel: Malvern 68855.

**SHARP PC1211** pocket computer and CE 122 printer/cassette interface. Three manuals, mains P.S.U. and printer paper, £60. Tel: 031-343 3725, Colin.

**WANTED COMMODORE 64** preferably with cassette unit, swap for TI994a with Parsec, Munchman, Invaders, Household Budget, Management (command modules) plus 21 cassette games and cassette lead. Tel: Cyrus after 6 30 pm

**SWAP DRAGON** hi-res or Ghost Attack cartridge for Chess of swap both for J.C.B. sound of speech module. Tel. 01-821 1710 after 9 pm.

**SPECTRUM SOFTWARE**, swap Richard Shepherd's Ship of the Line and Trans Tower for Black Crystal, Valhalla or any one for Pssi, Super Spy, any adventure Tel: Jeff (Birmingham) 779 3026

**LOADS OF SPECTRUM SOFTWARE** to swap, sell two-thirds new price such as Scrabble, Conflict, Zuas etc , swap for software or hardware. Call or write Austen, Kettering Court, Thornton Heath, Surrey.

**BI-DIRECTIONAL** 80-column dot-matrix printer, CBN Tronics OC serial 1/8 W manual, £220, unused MZ80K I/O box £75, serial board £60 Wanted twin floppies for MZ80K W post board Tel: Ray Pearce, Southampton 788278.

**INTELLIVISION** plus 14 cartridges including Astrosmash, Frog Bog, Microsurgeon and more, worth £375, yours for only £150. Great value from P Bevin, 62 St Denis Road, Selly Oak, Birmingham B29 1LR. Tel: (021) 476-6880 after 6 pm.

**TRS-80** model 1, level 2, including manuals, books, all leads, PSU and much software, will sell for £150 or swap for Commodore 64 including PSU and leads. Tel: (0442) 52444

**TI99 CASSETTES**, leads and Munch Man cartridge, £50 Tel: 485 8393 after 5 pm

**DOLPHIN 80P PRINTER** compatible with BBC but needs interface. can have 80 or 136 characters per line over 4000 sheets, 9in paper, £200 ono. Tel. 0268 412549 after 6 pm

**SHARP MZ 80K**, 50K Ram Quantum, hi-res, 4-Basics Forth, two assemblers, disassembler, machine code, utilities and many games, manuals, monitor plus basic, listings, magazines, books, user notes. Excellent condition, dust cover, cost £800 +, accept £450 ono. Tel. 01-889 1090.

**UK101 8K**, cased Wemon monitor, ETI 2000 baud tape loader, £130. Tel: 085 682 200.

**FOR SALE** or swap Sharp MZ80-A, excellent condition, hardly used, with 100+ programs and four languages, £300 or swap for BBC micro model A (or B). Other offers considered. Tel: (Bottwell) 863460

**ORIC 1 48K**, never used. Bargain at £90. Tel: Kim, 01-673 6735 after 6.30 pm.

**FOR SALE**, Salamander, Franklin's Tomb, Star Jammer, Microdeal, Space War, Shuttle; Dragon Data Dr. Mountain. The lot £20 ono. Will separate. Tel: (Cornwall) Mawgan 500

**ORIC 1 48K** computer, including bought software: Dig-Dog, Night Cycles, Oric Trek and Hopper plus leads and manual, £99. Tel: Sheffield (0742) 51235

**SHARP MZ80K** 48K Ram, monitor and cassette, three Basics an assembler and Z80 manual and tapes, £150. Tel: 66322 Ext 2802 Burton on Trent (daytime) Mr Bolton

**HEWLETT PACKARD 85A** desk top computer, 16K expanded to 32K, screen printer and micro cassette, print rolls and cassettes. Good condition, £1,145. Tel: Tadworth 3675

**TI99/4A** with extended Basic, Chess, Parsec, Munchman, Tombstone City, Speech Synthesis, cassette leads, Basic and games books, cost over £400, will sell for £200. David Hobbs (0442) 47661

**INTELLIVISION** + 9 cartridges including Lock 'n' Chase, Dungeons and Dragons, Star Strike, Tennis, Triple Action, ideal Xmas present, cost £290, sell for £125 ono Tel: 01-529 4357.

**TEXAS TI99/4A** hardly used, still boxed, few tapes, 1 cartridge, 2 joysticks, beginners Basic cassette + many magazines and programs, bargain £100. Tel. Way 43916

**SHARP MZ-80K**, 48K, built-in monitor and cassette, includes software, £200, buyer collects. Mr J. Jones, 94 Queensway, Didcot, Oxon.

**LYNX 48K**, all leads and manuals + PSU, introductory cassette + users group magazines, boxed, under guarantee, £175 Tel. 021-443 5381 (evenings or weekends).

**MICROLINE 82A**, dot matrix printer with graphic option, boxed, £200. Acornsoft view word-processor, £30. Tel (0344) 886 176

**LYNX 48K** + 8 games cassettes, manual + introduction tape, 2 books, user club news letters, guaranteed, £180 Tel (0634) 402694 (after 6 pm)

**SHARP MZ80K**, 48K. Basic extension tape, data base cassette, 100 games and assorted programs, Sharp soft users notes, price £240 Tel: 054-3256138.

**TI99/4A**, complete with cassette leads, Beginners Basic cassettes, and manuals, boxed, as new, offers invited, or would consider swap Tel. (0252) 513248 (anytime).

**FOR SALE**, 1K ZX81 + keyboard + 4 books containing over 100 programs + manual and all leads, £25, very good condition, the ideal Xmas gift, buyer must collect or pay postage Phone 021-772 3873, soon!

**BBC MODEL B**, Acornsoft, swap Rocket Raid, Arcadians, Killer, Cowboy Shoot Out, Dragon Chess Tel: Derby 700088

**FULLER KEYBOARD**, brand new, never used, worth £30, sell for £15 Tel 01-698 5971.

**HP41C** + 3 memory modules + stats pack + maths pack + printer. £250 ono Tel 01-735 3681 (evenings)

**SHARP MZ80A** for sale, includes some software, £250 ono. Tel Burnley (0282) 36327

**CENSORY G** chess computers for sale, offers Tel: 01-854 7913 rm 423.

**TI99/5**, extension Basic, Attack cartridge, other software for £100 Tel: 074-488 2430 (anytime)

**AQF**, joystick, interface 2 for Spectrum, user's Atari joystick — works with many games like Manic Miner + Lunar Jetman, £12 Tel Bristol (0272) 685504

**SCRABBLE**, brand new in box, half price, £8, Write 15 Frome, East Tilbury, Essex RM18 8TD

**PRINTER, TELETYPE MODEL 33**, complete with papertape punch, reader and floorstand, can be seen working, ideal for conversion to computer printer, £40. Tel Hemel Hempstead (0442) 67918 (after 6 pm)

**FOR SALE**, Bug-Bytes, Vic Panic original cassette, hardly ever used, accept £5, or swap for Another Vic in the Wall. Tel: Kidsgrove (07816) 3718 or 2640.

**LYNK 96K** upgraded machine including software, printer cable and books. Quick sale, offers over £200. Tel: 01-658 0645.

**IKON HOBBIT** floppy tape system for BBC, hardly used, including six data cassettes, zero memory Rom. Cost £195, accept first offer over £150. Tel: 01-658 0645

**FOR SALE:** Dragon 32K in mint condition, includes over £160-worth of software, joysticks, manual and books. Will sell for £200 ono. Tel: (St Helens) 051-430 0741.

**ORIC** 16K plus one tape, worth £103. Unwanted gift, sell for £80 or swap for 48K Spectrum Tel: Crawley 518460.

**16K ZX81** and software, £45. Tel: 0505 842828

## ZX81s for sale

**ZX81** plus 16K [illegible] printer cassette recorder, £25 software, ZX81 executive case. Worth £155, sell for £115 or swap for Vic20 plus cassette. Tel: Wakefield 259767

**ZX81** 16K, manual, leads etc, Sinclair belt, software, Pimania, Avenger etc Best offer secures. Tel: Thorham Common 6421

**ZX81** 16K Ram, leads, manual, machine code book, two games books, £60 ☒ software including: Flight Simulation, Galaxians, Labyrinth, Space Raiders, £60 ono Tel: Glossop 3516

**ZX81 SOFTWARE.** Includes Brick-Stop, QS Scramble, QS Defenda and QS Asteroids. All tapes in original condition. Tel: 0984 23763 for details and prices. No offers ignored. No time wasters.

**ZX81 16K,** software — Trader, £6; Flight Simulation, £4; Orwell cassette four, £4, 3D Defender, £4, QS Scramble, £3; Space Raiders, £3. Mr A. ■ S Wheeler, 38 Bede Road, Barnard Castle, Durham

**ZX81** plus 16K Ram pack, with manual, including power supply, etc, software worth £16 and print 'n' plotter pad, well cared for, ideal for beginner, £50 ono. Tel: 01-960 0094 evenings

**ZX81 16K,** leads, manual, PSU, books, £200-worth ■ software — all current, superb condition, would make a nice Christmas present, make me an offer, I might accept. Tel: 042 879 3813

**16K ZX81** plus leads and manuals + software including Pimania, Flight Simulation, Catacombs, Sorcerers Island, etc + Mastering Machine Code book by Toni Baker. £50 ono. Tel. 0787 (Essex) 475022

**ZX81**, 16K memory pack, Kempson keyboard, case, box and £40 of software, selling it for £75. Tel. 01-670 3817

**ZX81**, 16K Ram, including books, programs and consul Price £60. Mr Cruse, 3 Dorset Way, Twickenham TW2 6NB.

**ZX81** 16K Fuller keyboard, joystick and interface, software, book and magazines, cost £160, very good condition, £65 ono. Tel: Bourne End 24201 after 5 pm

**16K ZX81** plus £25 of software, immaculate condition, still boxed with manual, £40; also Sinclair 16K Ram pack, as new, £15 Romford 61557.

**ZX81 16K,** Maplin keyboard, DK'Tronics graphic board, 4K + 2K chip, aluminium case 14½" x 14½", cassette recorder, leads, manuals, b/w TV, software, etc, swap for Vic20 expanded, games, recorder, manuals, or £120.

**ZX81,** 16K Ram pack, QS Scramble, selling it for £55, offers considered. 01-575 3865, ask for Levine.

**16K ZX81** + Fuller keyboard, excellent condition, with £50 of software and loads of magazines, will sell separately or the lot for £70 ono. Tel: 01-698 5971

**ZX81 16K,** keyboard, sound pack, graphic Rom board, all in a consol case, £50 ■ magazines + books, lots of software + Tron, 14-inch b/w portable TV, offers over £160. Call evenings Anoosh, 01-998 8117.

**ZX81 16K QUALITY KEYBOARD,** 20 games, manual and leads, £65 ono. Tel: 0952 811399.

## Commodores for sale

**VIC20** with cassette unit, 3 months old, games including Fly Snatcher, Blitz and Alien Blitz, Asteroids, Food Machine, sell for £120. Tel: (Hastings) 431198.

**VIC20,** C2N cassette deck, starter pack with introduction to Part I, 27 games, boxed, as new, 6 months old, 6 months guarantee left, sell for £150. Tel: Crawley 22141

**ORIGINAL VIC20 3.5 ARCADE GAMES,** including Asteroids, Pucky, Astro-Land, Treasure Maze, Target Shoot, all on one great cassette and only for £3.95. Phone Northwich 782475 after 5 pm

**VIC20,** plus 16K Ram, 6 months old, plus software. £125. Phone 01-989 1679 after 6.30 pm

**16K VIC20,** cassette unit, super expander, Omega Race, hi-res graphics, book, joystick, many other games, worth £300, selling for £150. Tel: 0883 48554 (evenings)

**VIC20** + cassette unit + 3K super expander + Star Battle cartridge + software, cost £265, sell for £120. Tel: 01-204 4596 (after 4 pm).

**VIC20** + C2N cassette recorder + 6K, 14 games cartridges + Programmers Aid + Mission Impossible, £400 of software. Vic Revealed + compiler. Forth + Chess, worth £700, sell for £160 — will not separate Tel 01-579 2129 after 4.30 pm

**VIC MEN,** original tape for Vic20, offers? Tel Stevenage (0438) 811834 after 7 pm.

**VIC20 SOFTWARE,** over 25 Vic20 tapes (originals only) at £2-£3 each, e.g. Micropoly, Battle of Britain, Snooker, etc. Tel 0438 811634 after 7 pm

**COMMODORE VIC20 FOR SALE,** including games cartridge, £70 ono Tel: Chorley (02572) 75035.

**21K VIC20** + C2N + Introduction to Basic I + 4 cartridges + Point Master + £300 of software, cost £700, sell for £230 ono Tel Reading 883238.

**VIC20 SOFTWARE** to swap or sell. Tel: 05212 3503

**25 UNEXPANDED VIC20 GAMES** (yes 25), including Ski-Run, Pontoon, Slot Machine, 5 adventures, hi-low, etc. only £5 !!! Phone Lye 3057 after 6 pm (ask for Adrian)

**VIC20 SPEECH SYNTHESISER CARTRIDGE,** cost £65, unwanted gift, with full instructions and demo cassette. £40 ono Mr Oldfield, Albion Terrace, Lynemouth, Northumberland NE61 5TA.

**VIC 1540 SINGLE FLOPPY DISK** to swap for Commodore 64 with cassette recorder or will sell for £220 ono. Tel 0622 813794

**VIC20** + C2N + 3K + 8K + 16K + joystick + programme reference guide, etc. swap 48K Spectrum. Phone 01-658 2261 (daytime).

**VIC20** + 16K (6K 3 slot motherboard + 8K cartridge) cassette unit, good condition, loads of software, joystick, 3 good books, only £130 ono Paul Johnston, 7 Dunedin Road, Corby NN18 9JX

**VIC20,** C2N + 16K + 8K, revision programs, Dr Watson's Assembly + over 45 original games, including Arcadia, Skyhawk, plus much more. Also manuals, reference guide, will sell separate or all for £250. Call Kelan at 788-0630 (evenings)

**VIC20,** £75 ono, innovative computing £00, Getting Acquainted with your Vic £2, Bug-Byte Asteroids £5, Backgammon £5, Audiogenic Amok £4, programmer's reference guide £8, Quicksilva Skyhawk £7, dustcover £1, Starbattle £7. Christchurch (0202) 483807

**COMMODORE 64** with cassette unit plus handbook and £30 worth of software. £200. Tel: 43636 (daytime), 371638 (evenings), Derby

**VIC20** with tape recorder, 20K expansion, joystick, £200 of software + books + magazines, sell for £150 or swap for 48K Spectrum. Tel: High Wycombe (0494) 716520.

**VIC20** Adventureland cartridge, will swap for any other in Scott Adams series or sell for £8. Tel: Rochdale 0706 358419.

**VIC20** lightpen + games, cost £34.50, bargain at £22. Ring 0743 60890 (after 6 pm) ask for Michael

**VIC20,** 1 month old, Introduction to Basic Part I, C2N tape recorder, Personal Computing for the Vic20, £20 software, sell for £100. Tel 359 1151

**VIC20** - 16K Ram switchable + 2 games cartridges + programmer's reference guide + 20 games etc on tape + magazines, £99. Phone Watton (0932) 229646.

**VIC20 16K RAM PACK,** £300 of software, joystick, books, six months old, excellent condition, many cartridge games. All for £225. Tel 881-1756 evenings.

**VIC20** plus C2N cassette unit plus joystick, all leads and software. £110. Tel. (Southend) 0702 713755.

**VIC20** plus C2N cassette, 8K, super expander, Bull, plus, motherboard, light pen, joystick, literature and many games, worth £370, sell for £250. Tel Boldon 363680 after 5 pm.

**VIC20,** cassette, joystick, £20 worth of software, manual, programmer's reference guide and magazines. £100 ono. Tel 01-843 0858

**VIC20 DATACASSETTE BOOKS,** 3K Ram, 16K Ram, Super Expander, 30-40 plus tapes, three games cartridges, machine code, monitor, good condition, boxed. Tel 0203 (Coventry) 76831

**VIC20 CARTRIDGES** for sale or swap for BBC B software. Avenger, Rainace, Jelly Monsters, Alien, Star Battle, Road Race, Adventure Land, £12 ono each. Tel Chelmsford (0245) 468954 after 6 pm or weekends

**VIC20** plus cassette unit with dust cover and quick shot joystick, five books, lots of magazines and lots of software, ex. games, music educational, etc. Offers please. Tel 061-339 3227

**COMMODORE- 64** plus Commodore cassette player and games plus programm book and magazines etc. Purchased last month. Mint condition. Offers realistically of £250. Tel 01-568 7325

**VIC20,** still under guarantee C2N cassette player, joystick plus two cartridges eight machine code games, Vic programmer's reference guide. £110 ono. Tel Radlett 7506

**VIC20** plus cassette deck, Introduction Basic Part 1, joystick and 16K switchable Ram Pack plus £80 of software and magazines and books, sell for £200. Tel 5563824

**VIC20 BOOKS,** software, £75. 16K Ram, Programmers Aid, Hesmon £20 each. All boxed, as new. Tel 654 4899 after 6 pm

**VIC20** Choplifter cartridge for sale, £20, cost £25 (needs a joystick) Tel (0222) 842649 after 5 pm

**VIC20,** 16K, C2N cassette deck super expander, joystick, Jelly Monsters, Avenger, Road Race, Adventure Land, Pirate Cove, Physics Revision. Cassettes. Excellent condition, sell for £150. Contact John Mudge on Uxbridge 38397

**COMMODORE VIC20** cassette deck, super expander, point master joystick, games including Avenger, Sargon Chess cartridges, months old, £150. Tel: (0565) 4712

**VIC20** plus C2N cassette unit, joystick, dust covers, £50 of software and Vic magazines, all boxed as new, sell for £120. Tel. Sammy 01-958 5013 evenings.

**VIC20 EITO/SOSTELL,** under guarantee, CN2 unit, plus expansion, all £130. Tel: Farnborough, Kent 54609

**VIC20,** plus C2N plus 16K Ram and Introduction to Basic plus £75 of software, £168. Tel: 041-772 2055

**VIC20 C2N TAPE DECK,** 32K Ram Pack, switchable to standard plus 3K plus 16K plus 24K plus 32K. One hand, quick shot, joystick, books, manuals and magazines. Cassette software. Under guarantee. Offers. Tel: 0981 250420 after 5.30 pm.

**COMMODORE VIC-20 C2N.** Lots of programs and books. All leads, 10 months guarantee. Boxed, for £100. Tel: 0506 414432.

**VIC20 C2N** super expander, Introduction to Basic Part 1 and many other books, software including seven cartridges and cassettes over £500 when bought, will accept £350. Tel Blackburn (0254) 662385 between 5 pm and 7 pm.

**COMMODORE VIC20** with 16K Ram pack, C2N cassette deck, £165 of software, two educational cassettes, English and physics, one road race cartridge, one dust cover, Arcade software including: Martian Raiders and Parabroopers, £195. Mr S. R. Kelshiker, 22 Woodgrange Avenue, Kenton, Harrow.

**VIC 15-15 PRINTER,** including word pro cassette and new ribbon, £130. Tel. Evesley (0734) 732268.

**COMMODORE VIC20** 3-8K, joystick, tape cassette unit, over 25 cassettes and three games cartridge, £200. Tel: Fareham 230956 or write to 14 Dryales Close, Bridgeway, Gosport PO13 0SL.

**VIC20 16K CASSETTE UNIT,** £200 of software, £30 of books, one joystick, five cartridges, £220 ono or possibly swap 48K Spectrum with cassette and printer. Tel: Leeds (0532) 772818.

**VIC20 SOFT SWITCH,** never used, £18. Tel: Aldridge 51923.

**COMMODORE 64 1541** disc drive, disc daylight pen, reference guide. All for £50. Tel: 01-503 2931.

**VIC20** plus cassette deck and three joysticks. Many books, including Programmer's Reference Guide, loads of software. £150. Tel: Gerrards Cross 883 293 after 5 pm.

**16K FOR VIC20** with five 16K games. £30. Tel: 01-387 8751 evenings

**VIC20** plus C2N 3K expansion cartridge, two games cartridges, 15 commercial software games, including adventures, and tape, copier and joystick, magazines and books, as new, worth £350, will sell for £150. Tel: Blackpool 692323.

**VIC20,** with 16K cassette deck, joystick, paddles, many magazines, cassette games. £170 ono. Tel: Romford 67307

**16K VIC20** plus cassette deck, joystick and paddles, magazines, cassette games. £165 ono. Tel: Upminster 50552.

**VIC20,** 16K, C2N cassette, joystick, £150 worth of software, books, magazines, cost over £350, sell for £200 ono. Tel: Lindfield 2677 evenings

**VIC20** Adventureland cartridge, swap for Rat Race or other adventure cartridge except Count. Tel: Nottingham 204058

**COMMODORE PET 2001,** built-in green screen plus cassette recorder, 64K. £200. Tel Reading 866211

**VIC20,** C2N 16K, 3K super expander, four games cartridges, Gorf, Sargon, Choplifter, The Count Adventure, £160. Cassette software, joystick, will not separate. £170 ono. Tel: Bexhill (0424) 221298

**VIC20 ALIEN** cartridge, will swap for any Commodore adventure cartridge except Mission Impossible. Tel: Newton Abbot (0626) 3005 after 4 pm.

## Tandys for sale

**TANDY TRS80,** still boxed, 16K colour with 2 manuals, £190. Tel. B73370 (Birmingham).

**16K VIDEO GENIE,** some software available, all leads + manual, £150. Tel: Lewington 2595.

**32K GENIE,** 2 weeks old, £120 or swap for Vic20. Mike, 01-701 4115.

**VIDEO GENIE 16K,** built-in cassette, 14" TV included, lots of extras, fully expandable, excellent condition, £230. Tel: Nottingham 384961 for more details.

**COLOUR GENIE 16K,** software, books, manuals, all leads, brand new in original packing, £180. Tel: (051) 678 9237

## Dragons for sale

**DRAGON 32,** guaranteed, boxed, new, plus leads, manuals, £15 of magazines, £6 of books, £113 of original software, ideal Christmas present, total £338 plus joysticks, offers. Ring 772 3938 after 5-7 pm, ask for Martha Piggott

**DRAGON 32,** almost new, £100 joysticks cassette recorder, plenty of software, arcade games, adventures, etc, all very good condition, all for £200. Tel: Bedford 57407 after 5 pm.

**DRAGON 32,** 2 joysticks, cassette recorder, 3 cassette games, 2 cartridge games, nearest offer to £150. Tel: 01-868 7060.

**DRAGON 32,** cassette recorder, 30 tapes including Donkey King, Caterpillar Attack and Planet Invasion, two joysticks, books + magazines, £180. Tel: 01-703 7885

**DRAGON 32** plus 20-inch colour TV, over £100 of software, plus joysticks, 6809 machine code manual, etc, just £290. Tel: 0782 68894 after 6 pm

**DRAGON 32K** computer games plus two games programming book. Worth £84, will sell for half price or £4 each, or swap for knitting machine in working order. Tel. (St Helens) 051-430 0741.

**DRAGON 32,** joysticks, cassette recorder, plus £20-worth books, £80-worth software including Cosmic Invaders cartridge, Donkey King, Frogger etc and Dragon User magazines. A bargain at £195. Tel: West Lothian 0506 37745

**DRAGON 32,** nine cassette games, 10 books and two joysticks. Sell for £250 ono. Tel. Rugby 3655 after 4 pm

**DRAGON 32,** three joysticks, three books, £230-worth software. Offers around £170 considered. Tel: Bishop's Stortford 815823 after 6 pm.

**DRAGON 32,** £200 software including £50 word processor. Sony cassette recorder, two joysticks and instruction manual. Cost £375, sell for £215 ono. Excellent condition, boxed. Tel: 01-440 2227

**DRAGON 32K,** together with joysticks, light pen, telewriter, word processor and games, £210 ono. Onc 1, 48K plus Oricbase, Zodiac and Flight, £110 ono. Phone Nigel 01-485 1383

**DRAGON 32,** software, 2 joysticks, £430. Tel: 0744 27768

**DRAGON 32,** boxed, joystick, 5 games, book + manual + 4 Dragon User magazines + all leads, £140. Tel. High Wycombe 715789.

**DRAGON 32,** tape recorder, joysticks, light pen, books, magazines and £41 worth of software, Dragon Trek, Pimania, Crade, Quest, Defence, will sell for £200 ono or swap for CBM 64 + C2N cassette unit. Northampton (0604) 28319

**DRAGON 32,** boxed as new with manuals, boxed dual Dragon data, joysticks, Calixo Island and program books, £170 ono. Ring 061-998 8694 after 7.30 pm (not Wednesday).

# THERE'S NO PRESENT LIKE THE FUTURE.

## THE WORLD'S FINEST PROGRAMMING TUTORIAL FOR ONLY £12.95.

Thousands who own, or would like to own home computers have yet to experience the feeling of discovery that comes when you write your own programs. Yet learning programming can be easy.

"Learn Basic" from Logic 3 is the ultimate development of the method first devised at Strathclyde University – a straightforward, easily understood tutorial written by Professor Andrew Colin and Veronica Colin, authors of Britain's best-selling tutorial package.

Using the method tested by university students and used successfully by over 200,000 home computer users, "Learn Basic" runs on your own computer and explains everything in clear non-American English without jargon or computertalk. In a matter of hours, you will be writing programs that work.

Essentially, "Learn Basic" and the rest of the "Learn Computing" Series that will follow soon are designed for people who want to keep abreast of the computer age. For people who realise that understanding computers is the key to future success, at school, at work and as a parent.

Make your future, and your family's future, richer this Christmas.

Get "Learn Basic" by Logic 3 – two tapes and a full-size manual for Spectrum or Dragon (others soon) at just £12.95.

At that price, it's a gift.

Buy the Logic 3 "Learn Computing" Series at computer shops and major retail stores all over Britain. In case of difficulty, write to Logic 3 in Windsor.

TO: Logic 3 Ltd., Mountbatten House, Victoria Street, Windsor SL4 1HE.

If you would like to know more about using and programming a computer in your home, send this coupon for your free copy of our 16 page explanatory booklet "100 things you wanted to know about computers."

It will help you cut through the jungle of computer jargon, and give you news about software developments – even games. [ ]

Or send for our software catalogue (it's free) or both! [ ]

Name _____

Address _____

_____

_____

I have already / intend to get a _____ micro computer

(delete as appropriate)

PCW 8/12

LOGIC 3

- THE KEY TO THE WORLD OF TOMORROW

## UP UP AND AWAY

At last a genuinely interesting educational package for the Spectrum — *Ballooning* from Heinemann Educational Books.

The program itself involves piloting a balloon over various hills and mountains, using vents to lower you and the burner to raise you up. At various points in your trip you will be given different tasks to complete like getting and delivering medical supplies.

The manual/booklet not only describes the operation of the game, but is full of puzzles and information about the history of ballooning — all illustrated with photographs and colour drawings.

Other programs in the same series involve driving and being a special agent — your children might actually enjoy this series, maybe even learn something.

**Program** *Ballooning*
**Price** *£9.95*
**Micro** *Spectrum 48K*
**Supplier** *Heinemann Educational Books*
*22 Bedford Square*
*London WC1B 3HH*

## DREADED BUGS

Lothlorien is well known for its excellent war-gaming simulations, so its latest move is slightly surprising — the company has released a series of arcade games for the Spectrum and Oric 1.

*Micro Mouse* is the Spectrum game and is superb. It introduces an idea so obvious you wonder why nobody ever thought of it before. The program is about making a program.

On screen are the lines of a program that won't run because some bugs have stolen some of the letters and numbers in the program. *Micro Mouse* has to retrieve the stolen letters and replace them in their correct positions in the program.

He is hampered in his task by the dreaded bugs whom he must avoid at all costs. From time to time Micro is given a chance at revenge via a can of Datakill which wipes them all out for a while.

Once a program is completed it will run and you are treated to another, more complex, program to debug. The game is graphically excellent with smooth-moving sprites.

**Program** *Micro Mouse*
**Price** *£5.95*
**Micro** *Spectrum 16/48K*
**Supplier** *M C Lothlorien*
*56A Park Lane*
*Poynton*
*Stockport*
*Cheshire SK12 1AE*

## PRICE PROBLEM

One of the things that led to a falling off in the numbers of Dragon 32s being sold was almost certainly the lack of quality software.

Now that the Dragon has been given a new lease of life by various injections of cash, Dragon Data are obviously keen to ensure that history does not repeat itself. To this end, it has just issued 11 new games — all professionally packaged in what look like large video cases.

*Whirlybird Run* is a *Scramble* style game in which you pilot a helicopter over mountains and hills and past missile defences.

Later levels include swarms of alien fighters trying to knock you out of the sky. Like the original, you must replenish your fuel supply by bombing the enemy fuel dumps (why this should work is a mystery to me).

The game is graphically good, with the helicopter's rotors seeming to turn, and is also fast and addictive. Up to this point, then, I would recommend the game. The problem is the price — £12.95 really isn't justified even with the big box and two page manual. A Spectrum equivalent would cost more like £6.

**Program** *Whirlybird Run*
**Price** *£12.95*
**Micro** *Dragon 32*
**Supplier** *Dragon Data*
*Kenfig Industrial Estate*
*Margam*
*Port Talbot*
*West Glamorgan*

## HELPFUL CLUES

*Twin Kingdom Valley* is an illustrated adventure game for the Acorn machines and the Commodore 64.

Like the *Hobbit*, it is basically a text style adventure, but with every scene illustrated. In this case there are 175 different illustrations — some of which may contain helpful clues so they are more than just dressing.

Judging by the screen shots the graphics are well up to *Hobbit* standard and in other ways the games are comparable — both, for example, feature the passage of time as an important ingredient. Both can manage quite complicated instructions and, more generally, their worlds are similar — full of dragons and caves, treasures and forests.

Bug-Byte doesn't seem worried by its illustrious competition (now that *Hobbit* is on BBC and 64) though. At the bottom of the advertisements is the legend 'Eat your heart out Bilbo!' — whether he will remains to be seen.

**Program** *Twin Kingdom Valley*
**Price** *£9.50*
**Micro** *BBC/Electron/CMB 64*
**Supplier** *Bug-Byte*
*Mulberry House*
*Canning Place*
*Liverpool*

## FILM SET

*Zodiac* was the first of the Oric adventures to achieve anything like the cult status of the Artic adventures. So, there will be quite a lot of interest in the follow-up *House of Death*.

Although basically a text adventure in the classic mould, there are various puzzles and intelligence tests built into it.

The setting is a disused film set, the location for such classic horror films at *An American Werewolf in Guernsey*. The task is to find five treasures and return them to the starting place.

Aside from logical puzzles, problems can also take the form of monsters from the movies like werewolves, Dracula, etc.

**Program** *Oric House of Death*
**Price** *£9.99*
**Micro** *Oric 1*
**Supplier** *Tansoft*
*Units 1 and 2*
*Techo Park*
*Newmarket Road*
*Cambridge*

## PURE FANTASY

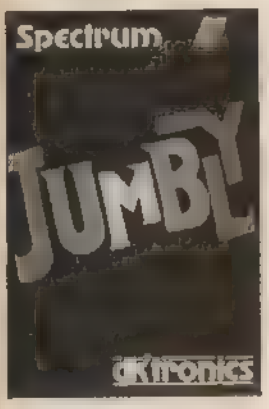
For those of you who, like me, had their imagination fired by the sequence in *2001* when the space ship slowly docks with the space station to the music of the Blue Danube, a new program may help you live out your fantasy to the full.

*2002* is a sophisticated simulation of the famous docking sequence, with you at the controls of the Orion spacecraft.

The high resolution of the BBC, coupled with superb 3D gives a spellbinding effect. There are six skill levels for everyone from the complete novice to the experienced astro pilot.

**Program** *2002*
**Price** *£7.95*
**Micro** *BBC B*
**Supplier** *Superior Software*
*Dept C*
*69 Leeds Road*
*Bramhope*
*Leeds*

## SLIDER TOY




*Jumbly* is here. Quite a few people wondered what those teasing adverts saying *'Jumbly is coming'* were all about. Now we know.

*Jumbly* is a computer version of those slider toys in which you have to move around various plastic tiles to make a picture.

However, what used to be a couple of hours entertainment has been extended to a couple of months worth, by a number of special features. Most importantly, there are a series of pictures — what number has not been given away.

Some of the pictures scroll in different directions, making it much harder to see what you are doing. Each picture also has a target number of moves in which it must be solved — only if you equal or beat this will you be allowed to go to the next one.

It is absolutely infuriating and my reaction was to throw something at the tv — others will doubtless get days of masochistic pleasure.

**Program** *Jumbly*
**Price** *£6.95*
**Micro** *Spectrum 48K*
**Supplier** *DK'Tronics*
*Unit 2*
*Shire Hill Industrial Est*
*Saffron Walden*
*Essex CB11 3AX*

## ARCADE HIT

Every so often, seemingly by some sort of Jungian telepathy, all the software houses decide to bring out home micro versions of an arcade hit at exactly the same time.

This month it is the bizarre game *Qbert*. This involves bouncing a funny little creature up and down a stack of cubes trying to land on each one. This is made more difficult by the presence of various similarly bouncing missiles that tumble down the stack.

There are any number of versions of the game for any number of machines (although I have not yet seen one for Spectrum).

One of the best is *Humphrey* which is true to the arcade original in every way except that the layout of the cubes changes with each screen of action. It runs on the Commodore 64 and is graphically excellent.

**Program** *Humphrey*
**Price** *£6.90*
**Micro** *Commodore 64*
**Supplier** *Mr Micro*
*69 Partington Lane*
*Swinton*
*Manchester M27 3AL*

## ABOVE STANDARD

If only it had the software back up the Texas TI99/4A would look excellent value for £90. Doubtless it's now far too late for this situation to change dramatically, but there are some interesting new programs around.

*Adventuremania* is a graphics adventure which uses all 16K and all colour sets. It's set in London — your first location is Trafalgar Square. The sleeve notes contain the dark warning 'beware the ungodly are everywhere', presumably this means the tourists.

The game is supposed to be fiendishly difficult — you don't even find out where you are going and what you are supposed to do until you find the hidden instructions half way through the adventure. The game looks above the usual Texas standard without being the usual high Texas price.

**Program** *Adventuremania*
**Price** *£5.95*
**Micro** *Texas Instruments 99/4A*
**Supplier** *Intrigue Software*
*Cranbrook Road*
*Tenterden*
*Kent TN30 6UJ*

## VISUAL MENU

There's no doubt about it. The Commodore 64 has great sound — if there's a single reason to switch from a Spectrum, that's it.

The problem is the effects are not very easy to get at — around five *Pokes* per noise. If only someone could make it simpler.

They have (aren't market forces wonderful) and *Ultisynth 64* is the result. The program enables you to use your Commodore 64 as a synthesiser, record your creations and play them back.

What the program does, essentially, is enable you to control the various parameters of each sound using a visual menu — for the note values you can use the keyboard, playing it like a piano.

What the program proves once again is that the Commodore 64 is a wonderful machine (some of the sounds are really impressive) but one that Commodore have documented very badly indeed — hence the place for programs like this. The manual that comes with the program is excellent.

**Program** *Ultisynth 64*
**Price** *£14.95*
**Micro** *Commodore 64*
**Supplier** *Quicksilva*
*Palmerston Park House*
*13 Palmerston Road*
*Southampton*
*Hampshire*
*SO1 1LL*

## LOST TOMB

*Aztec Tomb* is a graphic adventure for the Commodore 64 from Alligata Software. It's vast, taking 15 minutes to load, so it should see you all through Christmas.

Your task is to locate a lost Aztec tomb, hidden deep within the Amazon rain forest. Each location in the jungle is illustrated by a picture like the *Hobbit*.

The cover blurb warns you that this is no ordinary jungle, strange things can and will happen. The scope of the program and quality of the graphics should ensure that this one does well.

**Program** *Aztec Tomb*
**Price** *£7.95*
**Micro** *Commodore 64*
**Supplier** *Alligata Software*
*178 West Street*
*Sheffield S1 4ET*

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD

# This Week

| Program | Type | Micro | Price | Supplier |
|---|---|---|---|---|
| Advertiser | Ut | Spectrum | £17.95 | Brane |
| Alien Swoop | Arc | Spectrum | £4.50 | Space Age |
| Aliens | Arc | Aquarius | £5.95 | Add On |
| Battlezone | S | BBC | £6.95 | Lothlorien |
| Beyond Basic | Ut | Spectrum | £9.95 | Sinclair |
| Bubble Trouble | Arc | Spectrum | £5.50 | Arcade |
| Bugged | Arc | Dragon | £8.95 | Dungeon |
| Business Pack No. 1 | Arc | BBC | £159.95 | Gemini |
| Business Pack No. 2 | Ut | BBC | £79.95 | Gemini |
| Business Pack No. 3 | Ut | Electron | £79.95 | Gemini |
| Chuckman | Arc | Aquarius | £5.95 | Add On |
| Cosmic Split | Arc | Commodore 64 | £7.95 | PSS |
| Creator's Eye | Arc | Commodore 64 | £7.95 | Mogul |
| Data Genie | Ut | Spectrum | £9.95 | Audiogenic |
| Diabetes | Ut | Spectrum | £9.95 | Martin Dunitz |
| Dietician | Ut | Spectrum | £8.95 | Keysoft |
| Ed On | Arc | Aquarius | £5.95 | Add On |
| Evolution | S | Spectrum | £5.95 | Microsphere |
| Family Pack | Arc | Spectrum | £8.50 | Keysoft |
| Family Tree | S | Spectrum | £6.50 | Keysoft |
| Fig Forth | Ut | Commodore 64 | £19.99 | Romik |
| Fire Hawks | Arc | Spectrum | £6.95 | Postern |
| Five Treasures | Ad | Spectrum | £6.95 | Space Age |
| Floyd's Bank | Arc | Lynx | £9.99 | Romik |
| Freez'Bees | Arc | Spectrum | £5.95 | Silversoft |
| Galaxy | Arc | Commodore 64 | £7.95 | Anirog |
| Games Pack 1 | Arc | Lynx | £7.95 | Gem |
| Happy Letters | Ed | BBC | £8.97 | Bourne |
| Home Pack No. 1 | Ut | BBC/Electron | £79.95 | Gemini |
| Home Pack No. 2 | Ut | Spectrum | £59.95 | Gemini |
| House of the Living Dead | Arc | Spectrum | £6.90 | Phipps |
| Keyfile | Ut | Spectrum | £7.95 | Keysoft |
| Kick Off | Arc | Commodore 64 | £6.99 | Bubble Bus |
| Killer Knight | Arc | Spectrum | £5.90 | Phipps |
| Krystals of Zong | Arc | Commodore 64 | £7.95 | PSS |
| Laser Shaker | Arc | Spectrum | £5.95 | Poppy |
| Light Cycles | Arc | BBC B | £7.50 | Paean |
| Loony Zoo | Arc | Spectrum | £5.90 | Phipps |
| Magic Meanies | Arc | Spectrum | £5.95 | CDS |
| Metamorphosis | Arc | Commodore 64 | £7.95 | Mogul |
| Micro Drive In | Arc | Spectrum | £8.95 | Softel |
| Military Quiz | S | BBC | £5.00 | Logic Soft |
| Moby Dick | Arc | Commodore 64 | £7.95 | PSS |
| Mr Wimpy | Arc | Spectrum | £5.90 | Ocean |
| Music Master | Ut | Spectrum | £9.95 | Sinclair |
| Music Monitor | Ut | Spectrum | £4.50 | Space Age |
| N Vaders | Arc | Aquarius | £5.95 | Add On |
| Neotype | Arc | Commodore 64 | £7.95 | PSS |
| Oh Mummy | Arc | Lynx/Spectrum | £7.95 | Gem |
| Orion | Ut | Oric 1 | £12.95 | Lothlorien |
| Robot Riot | Arc | Spectrum | £5.95 | Silversoft |
| Roman Empire | S | Lynx | £7.95 | Lothlorien |
| Sam Spade | Arc | Spectrum | £5.95 | Silversoft |
| Scan | S | BBC B | £7.50 | Paean |
| Scroller | Ut | Spectrum | £7.95 | Brane |
| Spanner Man | Arc | Lynx | £7.95 | Gem |
| Sub Chase | Arc | Spectrum | £4.95 | Gem |
| Tank Attack | Arc | BBC B | £7.95 | Gem |
| Three Dee Space Wars | Arc | Spectrum | £5.95 | Spectrum |
| Timeman Two | Ed | BBC | £8.97 | Bourne |
| Turbo Grid | Arc | Vic20 | £5.50 | Microdeal |
| Urban Upstart | Ad | Spectrum | £6.50 | Richard Shepherd |
| Util 1 | Ut | BBC B | £9.95 | Gem |
| Wheelie | Arc | Spectrum | £5.95 | Microsphere |

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

**Key:** Ad — adventure/Arc — arcade/Ed — education/S — strategy-simulation/Ut — utility

# Book Ends

## PROPER BASIC

An excellent book for those who believe in doing things properly even if that means paying more is *Proper Basic* by Brian C Walsh.

Although clearly written and full of diagrams, the book looks as though it is primarily intended for schools and colleges. It contains more or less everything you could ever need to know about Basic in all its forms.

The book would be a good reference work for questions about the theoretical nature of Basic, but make sure it's really what you need — it costs £12.50.

**Book** *Proper Basic*
**Price** *£12.50*
**Micro** *General*
**Supplier** *John Wiley*
*Baffins Lane*
*Chichester*
*West Sussex*
*England PO19 1UD*

## MYSTERY

A nice idea for the younger computer owner. *The Bytes Brothers Input an Investigation* is a book in which fiction is interlaced with computer programs. The Bytes Brothers use the programs to help solve their mysteries.

Not, I should stress, that there is anything very gory or nail-biting about any of the stories. They're all about solving science projects and finding out how many marbles are in a jar.

**Book** *Bytes Brothers Input an Investigation*
**Price** *£1.25*
**Micro** *General*
**Supplier** *Fontana Paperbacks*
*8 Grafton Street*
*London W1X 3LA*

## EDUCATION

More than anything else the BBC computer is associated with education — both of children and adults.

*BBC Micro in Education* is a book aimed squarely at this market and is intended to be used by teachers within classwork as well as in homes.

The book is a mixture of general information about the history and development of computers as well as specific instruction on BBC Basic.

**Book** *BBC Micro in Education*
**Price** *£6.50*
**Micro** *BBC*
**Supplier** *Shiva Publishing*
*4 Church Lane*
*Nantwich*
*Cheshire CW5 5RQ*

# Top 10

**BBC***

| | | | |
|---|---|---|---|
| 1 | (5) | Planetoids | (Acornsoft) |
| 2 | (2) | Hopper | (Acornsoft) |
| 3 | (1) | Rocket Raid | (Acornsoft) |
| 4 | (—) | Chess | (Acornsoft) |
| 5 | (4) | Alien Swirl | (Program Power) |
| 6 | (7) | White Knight Mk 2 | (BBC) |
| 7 | (3) | Swoop | (Program Power) |
| 8 | (8) | Castle of Riddles | (Acornsoft) |
| 9 | (6) | Monsters | (Acornsoft) |
| 10 | (—) | Dr Who — The First Adventure | (BBC) |

*Alt Model B.
(Figures compiled by Micro Management, Ipswich 0473 59181)

**Atari**

| | | | |
|---|---|---|---|
| 1 | (—) | Miner 2049er | (Big Five)* |
| 2 | (—) | Shadow World | (Synapse)†‡ |
| 3 | (5) | Zaxxon | (Datasoft) |
| 4 | (—) | Ultima II | (Sierra On-Line)§ |
| 5 | (—) | Mariewder | (Sierra On-Line)‡ |
| 6 | (—) | Savage Island Part 1 | (Adventure International)† |
| 7 | (—) | GFS Sorceress | (Avalon-Hill)¶ |
| 8 | (—) | Lords of Karma | (Avalon-Hill)¶ |
| 9 | (—) | Escape for Pulsar 7 | (Channel 8) |
| 10 | (10) | Preppie | (Adventure International) |

*Cartridge. †32K cassette. ¶48K cassette. ‡32K disc. §48K disc.
(Figures compiled by Calisto Computers, Birmingham 021-632 6456)

**Vic20**

| | | | |
|---|---|---|---|
| 1 | (3) | Wacky Waiters | (Imagine) |
| 2 | (1) | Arcadia | (Imagine) |
| 3 | (—) | Jetpac | (Ultimate) |
| 4 | (—) | Catcha Snatcha | (Imagine) |
| 5 | (—) | Flight-Zero-One-Five | (AUS) |
| 6 | (—) | Tombs of Domb | (Audiogenic) |
| 7 | (7) | Skyhawk | (Quicksilva) |
| 8 | (6) | Gridrunner | (Llamasoft) |
| 9 | (2) | Wizard and the Princess | (Melbourne House) |
| 10 | (—) | Paratroopers | (Rabbit) |

(Figures compiled by Boots & Co Websters)

**ZX81***

| | | | |
|---|---|---|---|
| 1 | (—) | Flight Simulation | (Psion) |
| 2 | (—) | Football Manager | (Addictive Games) |
| 3 | (—) | 1K Games | (Artic†) |
| 4 | (1) | Defender | (Quicksilva) |
| 5 | (2) | QS Scramble | (Quicksilva) |
| 6 | (—) | Planet of Death | (Artic) |
| 7 | (—) | Invaders | (Quicksilva) |
| 8 | (—) | Mothership | (Softsync) |
| 9 | (4) | 1K Chess | (Artic†) |
| 10 | (3) | Asteroids | (Quicksilva) |

*All run in 16K. †1K only.
(Figures compiled by Boots & Co Websters)

**Spectrum**

| | | | |
|---|---|---|---|
| 1 | (4) | Chequered Flag | (Psion)* |
| 2 | (7) | Atic Atac | (Ultimate)* |
| 3 | (—) | The Pyramid | (Fantasy)* |
| 4 | (3) | 3d Ant Attack | (Quicksilva)* |
| 5 | (2) | Kong | (Ocean)* |
| 6 | (1) | Lunar Jetman | (Ultimate)* |
| 7 | (5) | Manic Miner | (Bug-Byte)* |
| 8 | (10) | Splat! | (Incentive)* |
| 9 | (8) | Flight Simulation | (Psion)* |
| 10 | (—) | Scrabble | (Psion) |

*Requires 48K.
(Figures compiled by W H Smith and Son, London)

**Books**

| | | | |
|---|---|---|---|
| 1 | (5) | BBC Micro Disk Companion, *Latham* | (Prentice-Hall) |
| 2 | (4) | Spectrum Microdrive Book, *Logan* | (Melbourne House) |
| 3 | (9) | Spectrum Interfacing and Projects, *Bishop* | (McGraw-Hill) |
| 4 | (8) | Advanced Graphics for the ZX Spectrum, *Angell and Jones* | (Macmillan) |
| 5 | (2) | 30 Hour Basic, *Prigmore* | (NEC) |
| 6 | (6) | Using the 64, *Gerrard* | (Duckworth) |
| 7 | (—) | CP/M — The Software Bus, *Clarke* | (Sigma) |
| 8 | (—) | Advanced Programming Techniques for the BBC Micro, *McGregor and Watt* | (Addison-Wesley) |
| 9 | (10) | Commodore 64 Programmer's Reference Guide, *Commodore* | (Commodore) |
| 10 | (—) | Master Your ZX Microdrive, *Pennell* | (Sunshine) |

(Figures compiled by Watford Technical Books, Watford 0923 23324 Prestel 26824) (Last week's position in brackets)

**Dragon 32**

| | | | |
|---|---|---|---|
| 1 | (2) | Pettigrew's Diary | (Shards) |
| 2 | (1) | Mined Out | (Quicksilva) |
| 3 | (5) | Dragonfly 2 | (Hewson) |
| 4 | (—) | Transylvanian Tower | (Richard Shepherd) |
| 5 | (—) | Cuthbert Goes Walkabout | (Microdeal) |
| 6 | (—) | SAS | (Peaksoft) |
| 7 | (4) | Ring of Darkness | (Wintersoft) |
| 8 | (—) | Tiger Grand Prix | (Tiger) |
| 9 | (—) | Dragon Trek | (Salamander) |
| 10 | (7) | Champions | (Peaksoft) |

(Figures compiled by Boots & Co Websters)

## Ziggurat

# Structured Pascal

Last week I examined some of the features of Forth, picking out those I think should appear in our ideal language. This week, I'll look at Pascal in the same way.

The most notable feature of Pascal is that it is structured. Effectively, this means that it discourages you from using *Goto* statements by providing *Repeat*, *While* and *Case* statements. Some beginners feel that structured programming is not beneficial, but I must stick my neck out and say that faster, better programs will be written if you use structured techniques.

Amateur programmers or beginners find *Goto* easier to use, but our ideal language is not aimed at either group. Beginners are well served by Basic, Pascal and Logo, whilst amateur programmers who persist in ignoring structured programming are doing themselves a disservice.

Thus, our ideal language will use the three basic structures of Pascal. Other elements of the structured nature of Pascal are the procedures and functions. I covered these in my last column, drawing the conclusion that not only should one be able to define procedures and functions, but also operators.

In addition, Pascal offers user defined data types. These are a great idea on the whole, but they lead in the odd Pascal situation where types cannot be mixed — eg, *'A : = 2+2.0'* causes a crash on most systems. I suggest user defined types should be implemented, with automatic type conversion where feasible.

One of the most important features of Pascal, and its siblings such as Algol and BCPL, is the block structure. This allows you to treat a group of statements as a single statement, if they are bracketed by special words or symbols. This is admirable, since it makes the language easy to compile and interpret, but is difficult for beginners to learn. However, one has to draw the distinction between easy to learn and easy to use. Block structuring is a tricky concept for some people, but once grasped, it is elegant and simple to use.

The feature of Pascal that seems to annoy people most is the use of the ':=' symbol to indicate an assignment statement. I am inclined to make the colon optional, on the understanding that many people do not find it necessary, especially those reared on Basic.

A major disadvantage of Pascal is that it is rarely interpreted. As I said before, our language must be both interpreted and compiled, to allow easy program development and both speed and security from the compiler.

This leads to several problems. For example, BBC Basic provides the *Eval* function to evaluate an expression. This is very useful in graph plotting applications, but it is impossible to compile. For example, consider the fragment:

```
D=23
D=A$"D*2"
PRINT EVAL(A$)
```

When this is compiled, the computer will no longer know the variables *D* and *A$* by name, only by their address. Thus, it will not be able to compile the previous routine.

The name of each variable could be stored in the compiled program, but it would add considerably to the space it takes up. A more pertinent objection is that the compiled code will need access to a complete expression evaluator, which forms a substantial part of the interpreter itself. Thus, the compiled code would swell to enormous proportions if *Eval* was used.

So, I maintain that certain functions are impossible to compile. This leads to an interesting question — should we provide these functions in the interpreter, but not in the compiler? If we do, there will be incompatibilities between the two, which is ugly. So, do you attach more value to compatibility or to features? Personally, I am tempted not to provide such functions at all, but there is room for debate on the subject.

Finally, some people have asked whether this series is building up to naming a specific language as the mythical ideal. I shall not divulge the answer yet — but it would be nice to find our ideal language existed. ■

**Jeremy Ruston**

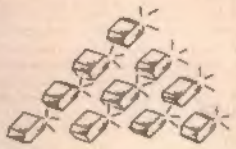
## Puzzle

# Forty thieves

**Puzzle No 86**

Once upon a time, many years ago, not far from old Baghdad, lived Ali Baba and his 40 thieves.

In their secret cave they examined the spoils of their latest robbery — a fortune in emeralds. The precious stones were laid out on the cave floor in the form of a triangular pattern similar to the one shown here:



As there were more jewels than is shown, the triangle was much larger than this, but its general arrangement was as illustrated, with every row being complete.

The next day, when Ali Baba awoke, he found to his horror that the 40 thieves had departed taking with them all but one of the jewels. They had divided up the jewels equally amongst them and, as they had one left over, they left it for poor Ali Baba.

What was the smallest number of gems that could have been present?

**Solution to Puzzle No 81**

The program generates integer squares, *Z*, and tests to see if each is made up of two integer squares, $A \times A$ and $B \times B$.

```
10 LET X = 2 20 LET P = 1 30 LET Q = 1 40 LET Z =
X*X 50 FOR A = 1 TO X- 1 60 IF A*A>= P*10
THEN LET P = P*10 70 FOR B = 1 TO X - 1 80 IF
B*B>= Q*10 THEN LET Q = Q*10 90 IF (Z -
B*B)/Q = A*A*10 OR (Z - A*A)/P = B*B*10
THEN PRINT "A*A =";A*A, "B*B =";B*B, "Z =";
Z 100 NEXT B 110 NEXT A 120 LET X = X + 1 130
GOTO 20
```

This gives an answer of 3249 ($57^2$) made up of 324 ($18^2$) and 9 ($3^2$).

**Winner of Puzzle No 81**

The winner is: G Murray, Honeyborough, Neyland, Dyfed, who receives £10.

DEAR AUTOMATA, PLEASE RUSH ME THE FOLLOWING .....

"THE PIMAN'S CHRISTMAS STOCKING", including "THE PIMAN'S GREATEST HITS" STEREO L.P CASSETTE, THE PIMAN 1984 CARTOON CALENDAR BOOK plus THE PIMAN'S OWN BLANK C20 COMPUTER CASSETTE. £3 ○

"MY NAME IS UNCLE GROUCHO, YOU OWE A FAT CIGAR" (48K SPECTRUM) "Not so much a game, more a way of life. Excellent, excellent." (Your Computer) with CONCORD-QE3-HOLLYWOOD PRICE & FREE SINGLE! £10 ○

"PIMANIA" "The best adventure game ever reviewed" (Sinclair User) With £8,000 PRIZE and FREE TERRIBLE HIT RECORD!! 48K SPECTRUM £10 / BBC 32K £10 / DRAGON 32 £12 / 16K ZX81 £5 ○

"GO TO JAIL" (48K SPECTRUM) "A triumph of the programmers art. Full marks. Another superb game from Automata" (Personal Computer World) £8 ○

"LAZER" (DRAGON 32 and 48K SPECTRUM) "Bloody wonderful game of rock and skill!" (Confectioner) £5 ○

"WORDS MEETS THE BIKERS" (ANY SPECTRUM) Arcade challenge, with an outrageous FREE HIT SINGLE! £6 ○

I ENCLOSE THE RIGHT MONEY, TOTAL ..... £

OR PLEASE DEBIT MY ACCESS / EURO / VISA / MASTER CARD

CARD NUMBER .....

MY SIGNATURE .....

MY NAME .....

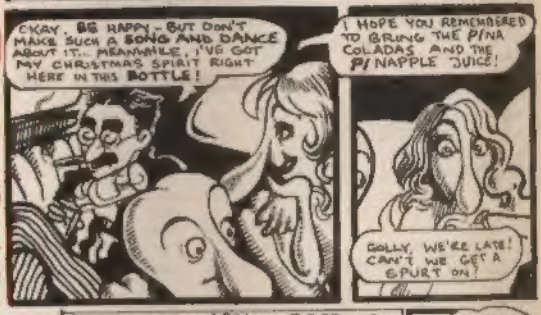
MY ADDRESS .....

.....

..... POST CODE .....

NO EXTRAS! ALL OUR PRICES ARE INCLUSIVE OF VAT AND DELIVERY

SEND TO: Automata U.K. Ltd.
27 HIGHLAND ROAD, PORTSMOUTH, HANTS., PO4 9DA, ENGLAND.....

* CHRISTMAS HOTLINE
24-hour mail-order service
Telephone (0705) 735242

THE STORY SO FAR: SANTA HAS BEEN CONNED BY THE WILEY ROTTERS, PENFOLD AND CROUCHER, OUT OF HIS TOY FACTORY, HIS HELPERS AND HIS ANNUAL CONTRACT TO SPREAD HAPPINESS AND JOY... SO, AS THE NORTH POLE PLANT IS GIVEN OVER TO CHURNING OUT AUTOMATA GAMES, THE PIMAN, GROUCHO AND LADY CLAIR SINCLIVE SHOOT DOWN TO THE "YOUR COMPUTER" CHRISTMAS FAIR, AT THE WEMBLEY CONFERENCE CENTRE (15th-19th DECEMBER) TO MEET THEIR BOSSES AND FLASH THEIR WARES....